THE ENGINEERING AND MINING JOURNAL.

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NOTE.—Communications relative to the editorial management should be addressed to Mr ROTHWELL. The articles written by Mr. Raymond will be signed with a star.

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AMERICAN INSTITUTE OF MINING ENGINEERS.

NOTICE TO MEMBERS AND ASSOCIATES.

A PART of the edition of the fourth volume of Transactions of the Institute will be bound in half leather and furnished to members at fifty cents for binding. The volume will be ready for distribution early in January, and members are therefore requested to give notice at once to the Secretary if they wish bound volumes; otherwise, uncut volumes in paper will be mailed as usual.

LAFAYETTE COLLEGE, EASTON, Pa. THOMAS M. DROWN, Secretary.

WORK FOR MINERS IN THE KANAWHA COAL FIELD.

WE gladly call attention to the letter of our special correspondent in the Kanawha region, who states that the mines in that locality are well supplied with orders, and that there is work there for some of our idle miners in the Anthracite fields. Our correspondent is not only a thoroughly reliable gentleman, but he is in a position to know the facts in the case. The total production of this region is but small, as compared with many of our other fields, and but a small number of miners are required there; but in these times of destitution, it is well worth while to point out a possible source of employment for even fifty or sixty men. Our correspondent's letter indicating the amount of coal being mined by each of the companies will guide those seeking employment.

INCOMBUSTIBLE MINERAL WOOL.

ONE of the most important uses to which furnace slag has yet been put is the manufacture of mineral wool, which is a most excellent incombustible non-conductor. This product is manufactured, under a United States patent issued to the late JOHN PLAYER, in May, 1870, by blowing steam through liquid slag, and its great value as a non-conductor has since been abundantly demonstrated, and is testified to by many of our best known firms that have used it. Owing to the death of the inventor, no effort was made to introduce this substance in this country till about year ago, since which time nearly half a million pounds of the wool have been used, and orders are now being executed for some 300,000 pounds more. In England it was introduced from this country, and subsequently, in 1871, into Germany, in both of which countries it has been generally adopted.

To those who have use for a non-conductor, either to prevent the radiation or absorption of heat, we commend an investigation of the claims of mineral wool. The fullest information on the subject can be obtained from Mr. A. D. ELBERS, whose prominent advertisement will be found on another page.

THE DOUBLE STANDARD.

REPORT OF THE DIRECTOR OF THE MINT.

OF this document we have already given a partial abstract, in a previous number; but its importance merits further notice.

The Director estimates the product of gold and silver in the United States for the fiscal year ending June 30, 1875, at $85,250,000, of which $46,750,000 was gold and $38,500,000 silver. This estimate is not accompanied by a detailed statement. We find in the Appendix, however, a number of official and other reports from various quarters, which seem to have been employed by the Director as a basis, though he evidently exercised his own discretion to some extent in combining them—a course which every compiler of statistics of mining in the West is forced to pursue. The circumstance that these figures refer to the fiscal (not the calendar) year, forbids a direct comparison of them with any other now before the public.

The statement furnished by Mr. VALENTINE, Superintendent of Wells, Fargo & Co's. Express, gives the product of the Pacific slope, including British Columbia and Mexico, and including also Montana, the principal mining regions of which, being watered by the tributaries of the Missouri, are not on the Pacific slope. On the other hand, Arizona is omitted entirely, although it belongs to that geographical division; and Colorado and New Mexico, with better reason, are likewise omitted. In most cases Mr. VALENTINE adds to the declared shipments of gold by express ten per cent., to cover the gold dust and bullion transported by other conveyance. The only noteworthy exception is Montana, in which case he adds about one-third for this item, and still falls short a million dollars of the estimate furnished by Marshal WHEELER to the Director. The omission of Arizona from the statement is probably the result of the hopeless discrepancy occurring a year ago between the Express reports and all others concerning the product of that Territory. At that time Mr. VALENTINE took occasion, unnecessarily as we thought, to allude to the estimate of the United States Mining Commissioner for Arizona and New Mexico as without any foundation that he could discover—taking for the purpose the Commissioner's estimate for a previous year. The inspection of the reports of the Governors of those Territories, given in this document, has doubtless convinced him that the Commissioner was not extravagant in his statement. At all events, if he has any shots remaining in his locker, he will see that they should be fired at the Governors and the Director of the Mint, who are responsible for much higher figures than the Commissioner.

Knowing by experience the difficulty of obtaining accurate figures, we are not disposed to find fault with any reasonable approximation; and it seems to us that the Director's estimate of total product, as quoted above, is tolerably fair. It shows that our product of gold is still greater in value than that of silver; and the Director's argument, based on this and other facts of the monetary situation, is an important practical contribution to the present discussion of the question of remonetizing silver.

The House of Representatives, after joining in the appointment of a commission to investigate this subject, has, with unseemly haste, in advance of the report of that commission, passed a bill for the restoration of the silver dollar of 412½ grains. There is little danger that so crude and absurd a measure will pass the Senate also. It is not impossible that the consciousness that the Senate will calmly revise this legislation has operated on the minds of many Representatives, who are quite willing to conciliate the "inflation element" among their constituents, without really committing the country to the disastrous policy which they seem to favor. Such Buncombe legislation would be no novelty. On the other hand, many members of Congress sincerely believe the wildest notions as to the competency of the Government to fix arbitrarily the relative values of the precious metals. The truth is, that a large part of the present House of Representatives are, under one disguise or another, Communists; that is, they are in favor of all sorts of legislation, defying the laws of trade for the benefit of "the working class," or the debtor class," or "the producing class," or some other class which they conceive to exist as an entity in the community. The trouble with their premises is that the workingmen of the country constitute its "creditor class," so far as any such body exists at all; and the trouble with their conclusions is that legislation cannot cure the evils which they imagine to afflict the body politic—unless that legislation is carried to the extent of actual *largesse* from the public treasury.

But aside from the unwisdom, as shown by history, of a double standard for legal-tender coinage, there are considerations affecting the proposition to make this change *now*; and these are very clearly put in Dr. LINDERMAN'S report. He shows:

1. That the coinage of the silver dollar of 412½ grains, while silver is worth in London less than 59d. per ounce, or the coinage of any silver dollar as unlimited legal tender, in which the silver is overvalued, would practically be the exclusion of gold.

2. That we have in the country available for resumption in gold about $150,000,000 of that metal, or more than half the amount required, while the stock of silver is not more than $3,000,000, exclusive of small change, plate, etc. Moreover, our annual product of gold exceeds in value that of silver. Hence it is folly to talk of aiding resumption by a measure which would drain us of our most available and abundant metal. A "corner" in silver might be a good thing for the mines; it would not help the country. Probably most of the hot advocates of the silver dollars are well aware that it would not assist the movement for resumption—and that is exactly why they like it.

3. In itself, gold furnishes the better currency for everything but "change."

4. If an International Convention, which the Director thinks ought to be convened, should lead to the adoption of a double standard for a term of years by Great Britain and the principal countries of Europe and America, the Director thinks "it might, and probably would, be to our advantage to assent." As there is about as much likelihood of the sky falling as of this contingency, we can afford to let the suggestion pass.

5. The Director "throws a tub to the whale" by recommending the extension of the legal-tender privilege for the silver coins from $5 to $10 in any one payment, and the continuance of the trade-dollar for purposes of Asiatic commerce. Beyond this, he advocates leaving the coinage as it now stands, and waiting for further light on the troublesome question of its amendment. We think the orators of argentiferous inflation will find it hard to answer his reasons.

COAL MINING IN OHIO IN 1876.

REPORT OF THE STATE MINE INSPECTOR, ANDREW ROY, ESQ.

COAL mining in Ohio has been very dull during the year just closing, and the total output of the mines, it is estimated by Mr. ROY, will not exceed, if it will equal, 3,000,000 tons (2,000 lb.), as compared with 4,346,653 tons in 1875, and 3,810,344 tons in 1874.

The present (3d annual) report, for advance copies of which we are indebted to the courtesy of Mr. ROY, forms a volume of 191 pages, and contains a vast amount of information on the mines and mining of Ohio. The principal mines in each district are minutely described, and in the latter part of the report is a description of the coal-beds and coal measures of the different districts. The information is mostly of a practical character, and makes the book, which, both in its matter and size, shows great industry on the part of Inspector ROY, very useful as a work of reference.

The art of mining is in a very backward state in the greater part of the Ohio coal-mines. The system in universal use is that known as "chamber and pillar work," in nearly all cases the chambers being driven as wide as the nature of the roof will allow, or from 18 to 30 feet in width, and the pillars between the chambers being left of dimensions only sufficient for the temporary support of the superincumbent strata; as a consequence, in some cases the pillars crush, in others the "creep" of the floor closes the chambers, and in all the coal in the pillars is lost beyond recovery. In many cases, Mr. ROY informs us, the loss of coal amounts to forty, and sometimes to fully *fifty*, per cent. of the entire seam; while in other cases, where the pillars are left large and the chambers are driven narrow, as at Pomroy (where the chambers are 21 feet and the pillars are 18 feet, with heavy entry or gangway pillars), it is possible to rob the pillars and get most of the coal: in this way as much as *eighty* per cent. of the whole is won, which, we are told, "is a very favorable showing."

Though the coal-beds all lie at very slight inclinations—nearly horizontal in most cases—and their thickness and the nature of the roof are such as would also adapt them to working by the "long-wall" system, it does not appear that this most advantageous plan has anywhere been adopted; yet it is well known that it produces a higher proportion of large coal, that less of the vein is lost, and that there is less danger to the men from falls of coal and roof, than under the chamber and pillar system. It is also easier to ventilate a mine worked on the long-wall plan than one in chambers, though this, apparently, is a matter but lightly estimated in Ohio, this report bearing ample, though sometimes involuntary, testimony to the fact that the coal mines of that State are, as a rule, very badly ventilated.

Many of the mines are entirely unprovided with any artificial ventilation, and as the beds are almost horizontal, and the several openings consequently on nearly the same level, the "natural" draught must be exceedingly feeble and totally inadequate for the efficient ventilation of an extensive mine, or, indeed, of any mine, during a large portion of the time. The mines are all quite shallow, and therefore in the last degree unsuited for the economical application of the furnace as a ventilating agent; yet we are told that there is but *one* mine ventilated by a fan in the whole State. Mr. ROY points out the advantages of the fan over the furnace for such mines, but we do not think he lays sufficient emphasis upon the fact that furnaces in such mines are not only far more expensive than mechanical ventilators, but they are always, and under all circumstances, sources of danger. Mining is as yet comparatively in its infancy in Ohio: the mines, mostly small, till within a few years have not possessed even furnace ventilation. To this must be attributed the comparatively small number of mine fires that have yet occurred there, though there have been quite enough to show the danger of underground air-furnaces and underground boilers. The present condition of the Ohio mines is that which obtained in the Pennsylvania anthracite fields about fifteen or twenty years ago, and in the European (English, French and Belgian) mines some twenty-five to fifty years ago; and it seems probable that the furnace infatuation will continue till the same expensive lessons by mine fires have been learnt that have excluded furnaces from the coal-mines in France and Belgium, and are rapidly displacing them by mechanical ventilators in England and in the anthracite regions of Pennsylvania.

The introduction of the long-wall system of mining and of mechanical ventilators in the mines are improvements which will assuredly come sooner or later, and with the expensive experience of other regions to profit by, it is to be hoped the Ohio mine-owners will not wait for an "Avondale," an "Empire" or a "Baltimore" disaster before excluding furnaces and steam-boilers from the mines.

Mr. ROY devotes a large space to the relations of employers and workmen, and wisely advocates boards of conciliation and arbitration as one means of avoiding strikes; but he thinks that the primary cause of strikes, and of the ill-will which too often exists between employers and miners, is to be found in bad ventilation. This appears to be a hobby of Mr. ROY, for he repeats many times the opinion that work underground away from the light of the sun, and with poor ventilation, are the causes of nearly all the ills that miner's life is heir to; or, as he expresses it, "many of their [the miners'] failings, their fierce and intolerant spirit, their hatred of their employers and of vested capital, their spirit of fault-finding, and their love of striking, are beyond any question of doubt caused by deprivation of solar light, and (more particularly) the ill-ventilated condition of the mines. * * * The miner dies at thirty-five years of coal-miner's consumption. * * * When the miner becomes worked down in exhausting subterranean regions to which there is no parallel on earth, and nature demands rest and recuperation, he finds it in a strike. * * * The best remedy for strikes is in applying thorough and vigorous and never-ceasing ventilation in the mines." When we consider that the State Mine Inspector has been appointed with the special object of seeing that the law is obeyed which requires thorough and sufficient ventilation in all the working parts of every coal mine in the State, and secures in other respects the safety and well-being of the miner, and that he has the power to close any mine where the owners refuse or neglect to procure such good ventilation, we cannot but marvel at the fearful amount of responsibility which Mr. ROY voluntarily assumes, and uncharitable persons will be apt to lay the blame on the Inspector if they can accept his theory as to the cause of strikes. We confess we cannot altogether accept Mr. ROY's theory, and with it his self-condemnation.

We believe the fact is beyond question that coal mines are, as a rule, very much better ventilated than factories or even than private residences on the surface, and they are by no means unwholesome places in which to work. The coal mines are, as a rule, dry, the temperature varies little winter or summer, and the work is by no means as arduous as in many occupations on the surface, while the hours are usually much shorter. There is no ground for the sensational statement that "the miner dies at 35 years of coal-miner's consumption," for coal miners of the present day are quite as long-lived as other classes, and they are as gay and cheerful a body as can be found. Indeed a miner generally prefers working in the mines to working on the surface.

That there are badly ventilated mines, and a good many of them in Ohio and in some of our other bituminous coal-fields, is due to the fact that in some States no mining law has been enacted, and in others its requirements are not strictly enforced. With the exception of this little bit of senationalism, Mr. ROY has presented a creditable and valuable report. We would suggest in this case, as we did in that of the Pennsylvania inspectors' reports, that a certain uniformity in the arrangement of the statistical information which the inspectors can obtain, would facilitate comparisons and add greatly to the value of their reports.

The mining law appears to have produced good results in Ohio as well as in Pennsylvania, and the lives lost, which in 1874 amounted to 30, were 23 in 1875, and 13 during the present year up to the 20th of November. The amount of coal mined has been about one-third less this year than in 1875. Owing to the time prescribed by law for making his annual report having been changed from the 31st of December to the 20th of November, Mr. ROY was unable to give the full production of the State, but he thinks it will not exceed 3,000,000 tons of 2,000 lb., while in 1875 it was 4,346,653 tons and in 1874 3,810,344 tons.

NEW PUBLICATIONS.

NOTES ON ASSAYING AND ASSAY SCHEMES. By PIERRE DE P. RICKETTS, E. M., Ph. D., Instructor in charge of the Assay Laboratory of the School of Mines, Columbia College. Octavo, 170 pp. Published by the Author; price, in cloth, $2.50; paper cover, $2.

IN this book Mr. RICKETTS gives us the results of the experience of himself and others in the assay laboratory of the New York School of Mines, and in concise language describes the apparatus and methods of assaying which have proved, after repeated trials by instructors and students, best adapted in every respect to the purposes desired. But little space has been devoted to subjects not having direct bearing on assaying, and the result is a compact and well-arranged manual, which must prove of value, not only to students, for whom especially the book has been prepared, but also to experienced assayers, who will find valuable hints and suggestions on almost every page.

The book is divided into four parts. In part first are described the apparatus, reagents, and general operations of assaying. In part second forty-four pages are devoted to careful descriptions of dry or fire assays, of the different ores of lead, antimony, gold and silver, platinum, zinc, mercury, bismuth, tin, copper, iron, nickel and cobalt, and for the testing of coal and other fuels. The third part, comprising about twenty-five pages, is devoted to the subject of wet assays—including the volumetric assay of bullion, and convenient wet methods, or combinations of wet and dry methods, for ores of platinum, zinc, bismuth, tin, copper, iron, manganese, nickel and sulphur. Part fourth, tables and references, contains the characteristic properties of precious stones, metals, and ores, conveniently arranged in tabular form, tables of weights and measures, and specimen printed forms for assay reports, note-book pages, etc. In an appendix we find additional remarks on manipulation; a few pages on qualitative blowpipe analysis, with a convenient scheme; and lists of blowpipe and chemical apparatus and reagents.

In part first are given drawings to scale of furnaces for roasting, fusion, cupellation and scorification, descriptions and drawings of crucibles, scorifiers, cupels and assay tools, and the conditions they should fulfill.

Among the assay tools is a new apparatus for grinding samples of ore, consisting of a cast-iron plate and rubber, apparently suggested by the grinding-pans used in the West for the treatment of silver ores.

"The plate is a flat-iron casting 18x24 inches and 1 inch thick. The surface used is planed smooth. The rubber or grinder is a piece of cast-iron 4x6 inches, 1¼ inches in the middle, by ¾ of an inch thick at the ends, thus having a slightly cylindrical convex surface, which should be true on the board at all points. The operation is much more rapid than with the ordinary mortar and pestle."

Among the illustrations in this part of the book we also notice a convenient form of laboratory desk, copied from those used in the School of Mines.

In the description of assaying operations, attention is called by the author to the importance of a proper selection of samples for assay ; and the directions given, though not perhaps as minute as they might be, contain many useful and suggestive hints.

In part second, the methods of dry assay for each metal are prefaced by a short paragraph giving the mineralogical name and chemical formulæ of the different ores, with the percentage of metal in each. The descriptions of the methods of assay which follow are clear and concise ; and at the end of each chapter, under the head of Remarks, the different methods are compared, their defects or advantages pointed out, and the results of test assays given. The chapter on Gold and Silver Assays is especially full and complete.

In part third, ten pages are devoted to a description of the volumetric method for assaying gold and silver bullion, as practiced at the U. S, Assay Office and elsewhere. Then follows a convenient assay for testing the extent of chlorination of a silver ore, and methods of wet assay for different metals. In the case of zinc, mercury, copper, and other ores, wet assays are far more accurate, and often simpler and more convenient, than fire assays. It is fortunate, therefore, that Mr. RICKETTS reconsidered his intention of confining himself to descriptions of fire assays, and omitting all mention of wet methods. The processes selected for description are, as a rule, well chosen and concisely described—in some cases, however, too concise, as in the scheme for the determination of sulphur, where the analyst will have to refer to some work on quantitative analysis for many details which have been omitted.

Finally, we will state that the book is handsomely printed, in large and clear type, on heavy tinted paper, and the illustrations well drawn and engraved. We would venture to suggest, however, that neither cloth nor paper binding is well adapted to stand the rough usage to which the book must be subjected in an assay laboratory.

KANAWHA MINING NOTES.

Special Correspondence of the Engineering and Mining Journal.

TO THE EDITOR : SIR—Within the last three months there has been a decided improvement in the coal business of the Kanawha Valley, not that the price of coal has advanced, but that the demand has increased and the companies are now generally running full time and have orders ahead.

The companies shipping by the C. & O. R. R. are now mining as follows, approximately in tons per day :

Lewiston	150 tons	Lewiston vein.
Eutopia	20 "	Huston vein.
Stuart M. Buck & Co.	200 "	Coalburgh vein.
A. B. Ault	20 "	Three-foot seam.
J. R. Smith	60 "	Blacksburg vein.
Paint Creek Semi-Cannel Coal Co.	50 "	
Dodderidge Mine	25 "	
Upper Creek	40 "	
Straughn's Mines	90 "	
Coal Valley	100 "	
Cannelton	200 "	Cannel and splint.

The Peytona Mine on Coal River is sending a part of its production over the C. & O. R.R., and within a few days shipments will also commence from Brownstown and from Coalmont. The latter has been leased by Mr. WELSH of Peytona. STUART M. BUCK & Co. have opened new works at the eastern end of the Coalburgh property, which will largely increase their output.

There is more call this season from the New York market for coal, but the principal demand comes from the railroads and from the dealers in the cities of Virginia. Even in the country towns within a few miles of the railroad the Kanawha splint coal is taking the place of wood.

The gradual extension of business is offering steady work to miners, and while there is no prospect of high wages, there is full employment for a much larger mining population, and many of the men now idle in the anthracite region could come here to advantage.

December 7, 1876.

NOTES.

THE tows of coal from Pittsburgh to Louisville range from 3,000 to 8,000 tons each, and from Louisville to New Orleans from 13,000 to 22,000 tons per tow. Owing to the increased width and depth of channel below Louisville a larger class of steamers are employed. The largest class of tows between Louisville and Pittsburgh have a superficial surface of 150 feet wide by 420 feet long, and the largest class of tows below Louisville have a a superficial surface of 250 feet wide by 520 feet long, exceeding two acres.

WE UNDERSTAND THE SAMSON RAILWAY JOINT, manufactured by the American Railway Supply Company of Pittsburg, has been, or is shortly to be, adopted by nearly all the prominent Western roads, among which we may mention the Illinois Central, Chicago, Rock Island & Pacific, Chicago & Alton, Chicago, Burlington & Quincy, and the Missouri Pacific. This is certainly a healthy sign, taking into consideration the generally depressed state of railroad business, and promises a successful future for this enterprising company.

TENNESSEE COAL AND IRON.—The Southern States Coal and Iron Company are steadily pushing forward their various enterprises at South Pittsburgh. Everything is being done with a view to permanency. The company have already commenced the building of South Pittsburg, which in the future is to play a conspicuous part as one of the great industrial centers of Tennessee. Foundries have been established and put in operation, and these will furnish all the patterns to be used in the business. Two foundations for furnaces are now being excavated. The Company make their own brick. The Company will have a machine to grind and wash coal of all its impurities before burning it into coke. The extension of the Jasper Branch Railroad, eight miles up the Sequatchie Valley, was commenced recently and will be completed by the first of April. Five coal mines will be opened along this extension. The Victoria mines will, however, be depended upon for a permanent supply. One hundred and eighty hands are now employed in getting out coal at this point for Nashville and Southern points as soon as the extensions is completed. About 200 persons are at present employed in all the departments at South Pittsburgh.

PULSOMETER TESTS.

TO THE EDITOR : SIR—The following experiment was made in December, 1874, under the auspices of the American Institute, on the "Pulsometer," a machine invented by C. HENRY HALL, Esq., and now manufactured by the Pulsometer Iron Works, in Jersey City.

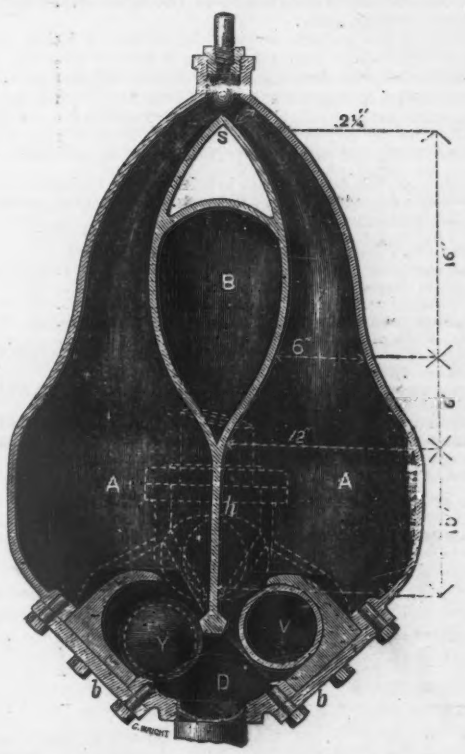
DESCRIPTION OF THE APPARATUS.

The pulsometer is a machine for pumping water by means of steam, into which the steam is admitted directly into the chamber containing the water, as in the original machines of NEWCOMEN and SAVERY. It consists of two hollow iron chambers which unite at the top and are connected with the boiler by a common steam pipe. Each chamber is "pear" shaped, with the large end down, and has a separate suction valve connecting it with the cistern from which the water is drawn through a suction pipe common to both chambers. Each chamber has also a separate discharge valve, connecting it through a common discharge pipe with the cistern into which the water is delivered. The complete machine contains, therefore, two suction and two discharge valves, like the ordinary double-acting pump. So far the machine is similar to the double-acting engine of SAVERY, described on page 5 of "The Steam Engine," by JOHN BOURNE.

The essential improvements of the inventor, apart from the details of construction, are :

1st. The application of a valve in the steam pipe arranged to admit the steam alternately and automatically into the chambers, so that while one is open to the boiler, and the water being forced out by the pressure of the steam, the other is closed to the boiler, and the steam which had filled it when it was discharged on the previous stroke being condensed by the cold iron walls, a partial vacuum is formed and the water sucked up from the cistern below.

2d. The application of one small valve opening inward near the top of each chamber, which valve admits a little air into the chamber when the vacuum is formed, and is intended to reduce the condensation of the steam during the discharge stroke by mixing it with a small quantity of air.



A section of the pulsometer is shown in the cut, in which
A.A. are the two chambers alternately filled with water and steam.
D is the suction pipe.
S the steam pipe.
b.b. are two hand hole plates for inserting the two suction valves.
Y.Y. the two suction valves.
B. an air chamber connected with the suction pipe.

The discharge valves are not shown in the section, being behind the chambers.

The pulsometer on which these experiments were made had the following dimensions :

Steam pipe	1 inch diameter.
Suction inlet	4 " "
Discharge outlet	3½ " "

Each chamber consists of a 12-inch sphere, lengthened by a cylindrical portion in center 4 inches long, with a tapering neck. From 10 inches above the discharge orifice to 16 inches above the same, being a length of 6 inches, the neck tapers from 12 inches to 6 inches, and from here to the top, being a distance of 16 inches, tapers from 6 inches to 2¼ inches. The internal capacity of each chamber from the top down to the level of the discharge orifice is very aproximately *one cubic foot.*

The valves to admit air were placed in each chamber about six inches down from the top. They were arranged so that the area exposed for the inflow of air during the experiment was about 1-200 of one square inch in each valve.

The action of the "pulsometer," as I understand it, is as follows :

Starting with all pipes empty, steam is first admitted by opening steam stop valves in pipe. If all the valves and joints are tight, the air will be expelled and all pipes filled with steam. The steam valve is then closed, and the steam in the pipes and chambers being condensed, the chambers will suck full of water. The little ball marked "T" in the cut, is arranged so that it may roll over the summit of the divisions between the two necks of the chambers, and will

alternately close the inlet to each chamber. Consider the case in which the valve closes the inlet to the right-hand chamber, both chambers being full of water. If the steam valve is opened, the water in the left-hand chamber will be rapidly forced out through the discharge valves into the discharge pipe until the surface of the water in the chamber is lowered below the discharge orifice. At that instant the steam in the chamber escapes by bubbling out into the discharge pipe, and a partial vacuum is formed in the chamber, because the steam will not flow through the limited area of the steam pipe as fast as it will be condensed. The water in the right-hand chamber presses the ball closing the connection with the steam pipe off from its seat, and the ball rolls over the summit and falls into its seat over the left-hand chamber with a loud thump. The right-hand chamber is now emptied by the pressure of the steam, while the left-hand chamber sucks full from the cistern below.

The chamber which is filling with water generally fills in about two-thirds the time required for the other to empty. The instant when it is full is shown by a little drop of water issuing from the air-valve which had previously been admitting air into the chamber.

At this time the chamber must have been partially filled with air which had come in through the air-valve, and the balance with water which had come in from the cistern below. The experiment was conducted in the following manner by Mr. R. H. BUEL and myself:

The pulsometer to be tested (a No. 7) was set up on the ground floor of the building and connected by an 8-inch pipe (cast-iron) with a well in the cellar. The water discharged was conducted by a 4-inch wrought-iron pipe through the upper stories and to the top of a temporary scaffolding erected on the roof, where it was discharged into a tank, and fell back through a wooden box or "flume" into a measuring tank on the ground floor, near the pulsometer. From this tank it fell through a "drowned weir" into the well in the cellar.

The speed of the pulsometer—that is, the number of beats or strokes it made in a given time—was regulated so as to maintain the water in the measuring tank at as nearly a uniform height as possible, and, therefore, to deliver exactly the volume of water that flowed out through the weir below. This volume of water was afterwards measured by noticing the time required to reduce the level of the water in the tank from 6 inches *above* the mean level during the experiment, to 6 inches *below* the same.

The steam used by the pulsometer was drawn from a boiler 80 feet distant through a 2-inch steam-pipe covered with 1½ inches of asbestos felting. The weight of steam used was determined by measuring the amount of water pumped into the boiler to maintain the level constant during the experiment. There was a pressure gauge on the boiler, and also one on the steam-pipe *between* the throttle valve and the pulsometer, which last indicated the pressure usefully applied. The following are principal dimensions of apparatus:

BOILER.—1 horizontal tubular boiler set in brick-work. Cylindrical shell 54 inches diameter, 8 feet long: 62—2-inch tubes 8 feet long. Circular grate 48 inches diameter.

MEASURING.—Tank of boiler iron 8 feet o¼ inch diameter, 56 inches deep. Weir or sluice inside 4 inches horizontally by 1½ vertically = 6 inches area.

WELL IN CELLAR.—Consists of a large shaft continued deeper by a smaller shaft.

Diameter of large shaft	13 feet.
Depth of large shaft	9 "
Diameter of small shaft	8 "
Depth of small shaft	6 "
Total depth of well from surface of water	15 "
Weight of water in well (calculated)	52,000 lb.
Distance from surface of water in well to center of pulsometer and pressure gauge	13 feet 1 inch.
Distance from here to center of goose-neck, being highest point to which water is raised	48 feet 8 inches.
Diameter of circle of goose-neck	1 foot.
Distance from center of pipe of goose-neck to lower end of return pipe	8 inches.

LOG OF PULSOMETER TEST, JERSEY CITY, N. J., DEC., 1874.

Hour.	Pressures. Steam boiler.	Steam beyond throttle valve.	Water pressure.	Number of single strokes per minute	Height of surface of water in measuring tank above lower edge of sluice in inches.	Height of water in glass gauge on boiler in inches.	Hour when barrel of feed-water was empty.	Temperature. Injection.	Discharge.	Feed.	Remarks.
							H. M.				3 55–60
2–50	79	22	20	44	..	8	..	59.0	69.0	38½	Separate thermometers measuring injection & discharge, interchange at this time difference, ½°.
3.00	84	13½	16	46	..	..	..	60.0	69.5	"	
10	76	16	17½	44	42.50	6¼	3.12	62.0	70.5	"	
20	79	19	20	48	43.75	6½	3.21	64.0	73.5	"	
30	80	19	18	48	45.50	..	..	66.0	74.5	"	
40	72	21	18	50	44.50	6¼	3.46	67.0	76.5	"	
50	78	21	18	46	45.75	..	..	67.5	77.5	"	
4.00	80	21	17	50	44.25	6⅜	3.58	69.0	79.0	"	Opened throttle a little, 4.00
10	75	21	19	46	46.75	6¾	4.08	71.0	79.5	"	
20	79	23	19	46	47.50	7	4.17	72.0	80.0	"	
30	73	23	19	46	47.00	7¼	4.32	78.0	80.0	"	Temperature of surface water in tank, 81°
40	66	22	18	43	46.00	7⅞	4.42	72.5	81.5	"	
50	78	22	19	45	45.00	8	5.00	73.5	83.5	"	
Mean...	76.8	20.5	18.3	46.3	45.00	..	..	67.5	76.5	38½	

Rises of temperature of water in well, °14·5; pounds of feed-water pumped into boiler, 1183·45; started at 2 hours 47 minutes. Running time, 2 hours 3 minutes temperature outside air, 30°; room, 40°; time occupied in filling tank 8 feet o¼ inches—diameter from 3 inches to 54¾ inches—10 minutes 45 seconds; number single strokes pulsometer during this interval, 463; time of emptying tank from 4 feet 4 inches to 3 feet 4 inches=2 minutes 1½ seconds.

The following results may be calculated from the foregoing data:

The experiment in filling measuring tank shows that the pulsometer delivered in 10 minutes 45 seconds sufficient volume of water to fill a tank eight feet ¼ inch diameter from 3 inches to 54 inches, making 463 strokes, being at the rate of 1,200 cubic feet (9,000 gallons) in one hour, or 1,200÷2,592=0·463 cubic feet per stroke. But during the experiment the pulsometer ran at the rate of 46·3 strokes per minute, and therefore must have delivered 1,200×46·3÷43·2=1,286 cubic feet (9,645 gallons) per hour.

The experiment on the time required to reduce the level of water in tank from 4 feet 4 inches to 3 feet 4 inches shows that at a mean head of 3 feet 10 inches, water would flow through the sluice inside of tank at the rate of 1,281 cubic feet, or 9,607 gallons per hour.

The mean of these two give for the delivery of the pulsometer when running at 46 3-10 strokes per minute 1,286+1,281÷2=1,283½ cubic feet, or 9,626 gallons per hour.

The weight of steam used being equivalent to the weight of feed water pumped into boiler was found by measurement to be 1,183-45 pounds in 2 hours and 3 minutes.

This weight may also be computed from the known weight of water in well and the rise of temperature due to condensing all the steam used by pulsometer to be 12,000×14÷1,138·3=1,146 4-10, showing a difference of 1,183 45-100—1,146·40=37 5-100 pounds to be condensed by radiation from

2·5	square feet	steam pipe difference of temperature	280°
26·0	"	suction pipe difference of temperature	27½°
50·0	"	discharge pipe difference of temperature	36½°
100 0	"	surface of tank pipe difference of temperature	36½°

The heat which would have been radiated would have been (allowing 3 units of heat per square foot of surface for each degree of difference of fluid inside of pipe and air outside) 34·9 pounds of steam, making a total weight of steam drawn from the boiler of 1,191·8. The mean of these two experiments is 1,191·3×1,183·45÷2=1,187·4 pounds of steam in 2 hours and 3 minutes, or 579 pounds per hour.

If this steam had been furnished by a boiler evaporating 8½ pounds of water from temperature of feed per pound of coal, there would have been required 67½ pounds of coal to pump 1,283 cubic feet of water to a total height of 62 46-100 feet.

The economy of steam pumps is usually rated in terms of what is called the *duty*, being the number of pounds of water raised one foot high by one hundred pounds of coal.

The duty equivalent to 1,283½ cubic feet of water having a temperature of 76° and weighing 53 pounds per cubic foot, raised 62½ feet by 67½ pounds of coal, is 1,283·5×53×62·5×100÷67·5=7 1-3 millions.

The pressure gauge on the discharge pipe beyond the discharge valve and 48 ft. 8 inches below center of goose-neck showed during experiments (see log) a mean pressure of 18·3 pounds. This gauge was afterwards compared with a column of solid water 48 feet 8 inches high, and found to be correct. During the experiment it indicated 18·3 pounds per square inch, or 2,635 per square foot. The head of water equivalent of the friction in the pipe is computed at 1·12 feet, making the total head of water over the gauge (48·66+1·12=) 49·78, and therefore the weight of a cubic foot of water (2,635÷49·78=) 52·9 pounds. The weight of a cubic foot of solid water 76° temperature would be 62·2 pounds, from which I infer 62·2—52·9÷62·2=15 *per cent. of the volume of the pipe was filled with air.*

This air could be seen in the measuring tank in countless thousands of little bubbles about 1-32 of an inch in diameter, which rose to the surface like the gas from our effervescing mineral water. The water-pressure gauge was compared with a column of water which had stood in the pipe 24 hours, and from which the air bubbles *appeared* to have escaped.

The volume of water and air delivered by the pumps has been shown to be 1,283½ cubic feet per hour. Of this, 15 per cent. (or 192½ cubic feet) was air, 9.4 cubic feet having been the condensed steam drawn from the boiler, leaving 1,283.5—192.5—9.4=1,081.6 cubic feet of solid water to have been raised from the cistern to the elevation of the goose-neck on the roof each hour.

The total number of single strokes of the pulsometer was 2,778 each hour, and the volume of that part of each chamber filled with steam each revolution approximately one cubic foot. The volume of mixed air and steam used to expel the water from the chambers was therefore 2,778 cubic feet each hour.

It is uncertain how much air remained in each chamber after the water was expelled. The water was lifted from the cistern 14 feet below by the vacuum, and given sufficient velocity to pass approximately 1,100 cubic feet through the valve opening of 9 square inches in less than half an hour (the vacuum chambers filled much sooner than the pressure chambers emptied), or nearly 5 feet per second, corresponding to a head of nearly 6 inches. The total vacuum necessary in the chambers was therefore equivalent to 14½ feet of water. About one-third of the volume of the empty chamber might have been filled with air at atmospheric pressure, of which 15 per cent. of the volume of the water, or 7 per cent. of the volume of the chamber, at a mean pressure of 18.3÷2+14.7=32.9, was afterwards carried off with the expelled water, leaving 17 per cent. of the volume of the chamber filled with air at atmospheric pressure. This air would fill 17×15÷35=nearly 7 per cent. of the chambers when compressed by the steam to 20½-pound pressure The volume equivalent to 7 per cent. of the chambers each stroke during one hour would be 180 cubic feet, and therefore the volume of steam used to fill both chambers was 2,778—180=2,598 cubic feet. The weight of steam equivalent to 2,598 cubic feet at a pressure of 20½ pounds above the atmosphere is 200 pounds. But the total weight of steam used per hour was 579, and therefore 579—200=379 pounds, or 379÷579=65½ per cent., was lost by condensation. The total steam used there was divided as follows:

To expel air and water	¼
To fill clearance spaces	⅛
Condensation	⅝

The internal surface of both chambers is approximately 14 square feet, and the condensation took place at the rate of nearly 26 pounds per square foot per hour, or about three times as fast as it takes place in the cylinder of the ordinary engine with same extremes of pressures.

The volume of water delivered was 1,085 cubic feet, and the height to which it was lifted 49 8-10 feet, corresponding to a pressure of 49.8×62.2÷144=21.5 pounds. The weight of steam corresponding to 1,085 feet at 21.5 pounds above the atmosphere is 98.6 pounds, but the weight of steam used was 579 pounds per hour, and therefore the proportion of the work in the steam actually utilized of that that could have been utilized in a similar engine lifting the same volume of water to the same height if there had been no leakage or condensation or clearance, and no resistance at the valves, was 98.6÷579=17 per cent.

Although the duty of 7 millions is not large, it is probably quite as good as would be obtained with the ordinary direct-acting steam pumps under the same circumstances.

No experiments were made to determine the effect of a greater or less speed of more or less air, or of any variations in the details given; but as the machine and apparatus were arranged by the inventor, he selecting the speed at which he wished to pump, and having it in his power to vary the temperature of the water by running the pulsometer a few hours before the experiment commenced, I have reason to believe the machine was working at its best advantage.

It will be observed, however, that the water in the well, 67 degrees, was not

far from the average natural temperature of water during a large portion of the year in this climate.

I am not able to give any opinion of the durability of these machines, not having had any experience, but should consider that until it broke down entirely it was as likely to maintain its duty of 7 millions under rough usage as the ordinary steam pumps. Very respectfully, THERON SKEEL.

THE MINERAL WEALTH OF JAPAN.*

By Henry S. Munroe, E.M.

(Continued from page 396.)

COPPER.

Although copper has been mined and smelted in Japan for nearly twelve centuries, the active working of the copper mines, as we have already seen, dates back less than three hundred years. The average annual production for the first two hundred and fifty years of the three hundred I would estimate at about 2,800 tons.† According to VON SIEBOLD,‡ the annual product in 1830 was fifty to sixty thousand piculs, which would equal 3,333 to 4,000 tons; while, according to the estimate of Mr. GODFREY, the present annual yield is about 3,360 tons. This yield, as Mr. PLUNKETT remarks,§ represents the product of about two hundred different mines; but, as will presently appear, four mines furnish about one-half of this amount.

Copper is found nearly everywhere in Japan. A list of localities, which I have compiled, shows that out of thirty-eight ken and fu, copper is reported to occur in thirty-three. The records of the Mining Office show that permission has been granted to work copper deposits in more than four hundred different places.

Many, if not most, of these so-called copper mines are very poor, and few can be worked with profit, even in those parts of Japan where labor commands but a few cents a day; but the abundance and wide distribution of copper deposits is interesting and encouraging.

Thus far the copper mines and copper smelting works have been conducted according to Japanese methods, no "western improvements" having been introduced either by the Government or by private enterprise. The secret of this conservatism lies in the fact that the more important copper mines and smelting works, as conducted, yield large profits, which the owners are afraid to jeopardize by any change; while in the case of their silver and iron mines, which have not been very profitable, they are willing and ready to accept and act upon foreign advice.

Ores.—Copper occurs, generally, as chalcopyrite, associated with pyrite or pyrrhotite and other sulphides. Occasionally a specimen contains a little erubescite, which mineral also was formerly found as an ore at one mine. Fahlerz (or tetrahedrite) and copper glance are also common ores; the former often containing silver. Native copper is quite rare, though occurring at several places. A specimen was given me by the superintendent of the Osarisawa mine, in Akita ken, as a great curiosity. The oxidized ores are rare, malachite and azurite occurring only in small quantities at certain mines. Cuprite (copper oxide) is more common, but is not often smelted. It serves the miner, however, as an important indication of copper; and, as such, often determines the course of his drifts and stopes.‖ Copper sulphate occurs in many mine waters; but is, I believe, not used for the extraction of copper. This water is, however, sometimes evaporated for the production of the salt.

Silver minerals are often associated with the ores of copper in the same vein. Of the permits granted by the Mining Office for the working of copper mines, nearly forty per cent. were for this class of deposits.

The copper ores of Japan are usually poor; containing, as mined, from two and a half to seven per cent. By washing, these ores are concentrated to yield eight to sixteen per cent of copper, twelve per cent. being the average richness.

Copper ores occur in Japan only in veins. These sometimes have all the characteristics of true fissures, but are more often of limited extent, and apparently only gash veins. In either case there is usually a certain amount of parallelism between the different veins in the same region, and, according to their direction, they may be grouped into two or more series, often differing somewhat in their characteristics.

The thickness of the veins varies from a few inches to three or four feet. The average thickness is less than one foot. The deposits are almost always of limited extent, and much dead work has to be done for exploration.

Metallurgy of Copper.—In the introduction I have briefly described the method of working employed in the mines of copper; and here a few words concerning the smelting process will not be out of place. This process, in its most perfect form, may be summarized as follows:

1. Roasting of ore in kilns.
2. Fusion of roasted ore in low hearth, producing matte and black copper.
3. Roasting of matte in kilns.
4. Fusion of roasted matte, producing impure copper, taken off in rosettes or cast in ingots, and a second matte, which is roasted and returned to the same operation.
5. Fusion of black copper from the ore fusion, producing impure rosette or ingot copper.
6. Fining and refining; usually divided into two operations, producing pure cake copper.
7. Fusion of slags.

When the ore contains silver, the black copper and copper from the matte fusion are treated with lead by a very effective liquation process, which I hope to describe at another time. The fining and refining of the copper is effected after the separation of the silver and lead. The fuel used for smelting is invariably charcoal, wood being used in the roastings. The furnaces are simply low hearths, excavated in carefully prepared beds of charcoal, and provided with a partial cover of clay for retaining the heat, and with large hoods for carrying off the noxious vapors and products of combustion. The roasting kilns are usually rude rectangular structures, built of stone. The blast for smelting is supplied by very ingenious wooden bellows worked by man-power. The smelting is always conducted on a small scale, and one operation rarely lasts more than a few hours.

As illustrations of the copper mines of the country, I will describe in detail, from my own notes, a few of the larger and more important.

The Ani Copper Mines, in Yamamoto kôri, of Akita ken, are among the largest and most important of the country. These mines extend over thirty or forty square miles, in which area there are many hundred different veins. In 1873 over three hundred of these were yielding ore, while there were perhaps twice as many not worked.

The most important and best defined fissures have a general north and south direction, more or less parallel to the strike of the rocks. Those of a second series, which comprise the majority of the veins, have a general east and west direction. The veins of this series are of limited extent. The veins of a third series run northeast and southwest. The north and south veins are said to contain a larger proportion of galena than the others. The country rocks are sandstones and shales, often more or less metamorphosed, associated with volcanic rock in dykes (?) and erupted masses.

The copper veins are usually thin, and the ore seams vary in thickness from a few inches to three feet, ranging usually between four-tenths of a foot and one foot, the average being five to six-tenths of a foot. The average richness of the ore from these mines is about five and a half per cent.; in certain districts, seven and a half to eight per cent. When concentrated by washing, the ore yields ten to sixteen per cent. of copper, the average richness being about twelve and a half per cent. The ore is copper pyrite, tetrahedrite (?), and other copper sulphides, associated with which are pyrite, galena, blende, etc., and sometimes malachite and azurite in small quantities. The ores also contain silver, and sometimes gold.

These mines have been worked for centuries with great skill, yielding large profits. The old Japanese methods of mining and smelting are still retained. At present, nearly three thousand men, women and children are employed in the mines and smelting works. In 1873 the total product was 1,029,484 pounds of copper, while in 1872, according to Mr. PLUNKETT, the yield was only 886,266 pounds.

The copper is sent, by river, to the Kagoyama smelting works, where it is refined, being previously treated with lead, by liquation, for the separation of the silver.

These Ani mines, with about sixty gold, silver, copper, lead and other mines in different parts of the country, formerly belonged to OHNO, a wealthy Japanese merchant; but since his failure, they have reverted to the Government, and are now under the control of the Mining Office. I am informed that it is proposed shortly to put these mines under foreign superintendence, with the view of substituting for the Japanese processes better and more economical methods of working. The results of this experiment will be of great interest, as these mines are among the best managed and most profitable in the country, and represent the best phase of Japanese mining and metallurgy.

The Osarisawa Copper Mines, situated in Kadzuno kôri of Akita ken. These mines are now actively worked on a large scale by Mr. OKADA, a Japanese merchant of Tokio. Japanese methods alone are employed, though an unsuccessful attempt was made some years ago by Japanese to introduce reverberatory furnaces for roasting and smelting. The ore occurs in nearly vertical fissure (?) veins, having a north and south direction, with branch (?) veins running east and west. The veins traverse slates and metamorphic sandstones, with which are associated masses of volcanic rock (trachyte ?).

The veins are somewhat larger in the average than those at the Ani mines; but the seams of ore are about the same size, averaging six to eight inches. An ore seam five feet in thickness, however, is reported to have been at one time worked. The ore was formerly rich, but at present the average is about five per cent. or less. Concentrated by washing, this ore yields eight and a half to nine per cent. In 1873 the average was 13 per cent. of copper. The ore is copper pyrite, with sometimes a little bornite, and is associated with pyrite and other sulphides. Specimens of pure bornite are sometimes found.

The production of this mine in 1874 was about 300 tons of copper; in 1873, 346 tons. Formerly, when the ore was richer, the annual yield is said to have been over 600 tons.

The copper is not refined, but is sent to market as crude copper in the form of rectangular pigs, branded with the name of the merchant in Japanese and English characters, and with the inscription in English letters: "COPPER MINE IN KAZUNO OF TICHIU."

Copper Mine in Sakai ken.—Mr. PLUNKETT's report contains a description, by Mr. GOWLAND of the Ozaka Mint, of a large copper mine in Yoshino kôri of this ken, from which account I extract the following details:

"The ore is copper pyrite, associated with pyrite and pyrrhotite. The ore seams vary between one and a half and three feet in thickness, are sometimes split into two, and often end abruptly. The gangue is calcspar and quartz. The yield is fifteen to twenty tons of copper per month, so that the annual product must be over two hundred tons. The mine is worked by Japanese methods, and yields large profits."

Kinonebira Copper Mine.—This mine, which I visited while on the island of Kiushiu, last summer, is situated in the village of Okawachi, in Ashikita kôri of Kumamoto ken.

The ore occurs in fissure veins, running east and west, and dipping twenty to thirty degrees. The average thickness of these veins is said to be three and a half to four feet, the greatest thickness six feet. The ore seams vary between seven-tenths and one and a half feet; though reported sometimes to reach a thickness of four feet. The richness of the ore varies between seven and twenty per cent., averaging thirteen per cent. The ore is copper pyrites, without gangue, except included fragments of a dark blue, slaty wall-rock.

This mine has produced largely; but is now flooded with water, so that but four or five tons of copper are produced per year. A new drainage tunnel was begun in 1872, which was, at the time of my visit, three years later, nine hundred feet long, and within about fifty or sixty feet of the vein. The face of the tunnel was then in very hard rock, and the progress was but one and a half feet per month.

Kumayama Copper Mine.—Mr. GEERTS* speaks of a large mine in Yehime ken, on the island of Shikoku, which is known as Besi san, or Kumayama. The ore is copper pyrite and tetrahedrite, associated with other sulphides, and contains silver. Mr. GEERTS calls this the largest copper mine in Japan. If so, the annual production cannot be less than five or six hundred tons. With the first three mines described, viz., Ani, Osarisawa, and the one in Sakai ken, we thus have four mines yielding a total of fifteen hundred tons per year—about half the product of the empire.

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* A paper read before the American Institute of Mining Engineers, at the Philadelphia meeting, June, 1876.

† Of 2,000 lb.

‡ Quoted by GEERTS, Transac. Asiat. Soc. of Japan, vol. III, part I, p. 43.

§ Mines of Japan, p. 12.

‖ BURGER,‖ quoted by GEERTS, Trans. Asiat. Soc. of Japan, vol. III, part I, pp. 31 and 33.

* Trans. Asiat. Soc. of Japan, vol. III, part I, pp. 28 and 40.

I add an estimate, taken from Mr. PLUNKETT's report, of the cost of producing one ton (2240 lb.) of copper by Japanese methods :

Cost of ore		$43.70 = 23	per cent.
Explorations		5.70 = 3	" "
Treatment of ore	Labor	87.40 = 46	" "
	Material	34.20 = 18	" "
Superintendence		19.00 = 10	" "
Total		$190.00	

This does not include cost of transportation to market.

LEAD.

The deposits of lead ore in Japan are neither numerous nor valuable. Galena is the only ore used, though other ores are probably to be found. I have so far met with no specimens of oxidized ores, nor can I find any mention of such. According to GEERTS,* jamesonite, and plagionite, antimonial sulphides, are found in many parts of Japan. These are, of course, not used as lead ores.

Galena occurs in Japan only in veins, usually associated with copper or silver ores ; and lead is, in most cases, a by-product of mines worked for other metals. In 1874 there were thirty-five mines producing lead, of which eleven were worked solely for that metal ; and, in all but two of the remaining cases, lead was only a secondary object of exploitation.

These thirty-five mines produced, in 1874, but 207 tons (of 2,000 lb.) of lead, more than half of which was the product of a single mine. Of the remaining mines, probably two-thirds yielded during the year less than one ton of metal each.

The explanation of this small production is to be found in the character of the deposits. The veins are usually thin, and always irregular and pockety. A large amount of exploring work must therefore be done, usually with very unsatisfactory results. A seam of ore four inches thick, when discovered, will pay the cost of working ; but the average thickness of the ore deposits barely reaches this limit. Ore seams one foot thick are very rare ; and the discovery of a pocket of ore four feet in thickness will be carefully chronicled and the tradition handed down for centuries.

For these reasons lead mining is usually, in itself, unprofitable. As a rule, the mines are worked only to supply the lead necessary for the extraction of silver from its ores or from argentiferous copper ; in which cases the cost of the lead is of secondary importance, and it may even pay to work the lead mine at a positive loss. In this lies also the explanation of the large imports of lead, though deposits of galena are by no means rare.

Lead Smelting.—The process by which lead is extracted from the ore is very simple. The ore is crushed and carefully washed, and all blende, pyrite, gangue, and other impurities removed, leaving nearly pure galena for treatment. The process may be summarized as follows :

1. Roasting of washed ore in kilns, producing a little lead, which is added to that of the next operation.

2. Fusion of roasted ore, with the addition of cast iron, in a low hearth : producing lead, which is cast into pigs.

3. Fusion of slags.

With certain ores, a little *yuhada*, or crass, is sometimes produced. This is roasted and returned to the ore fusion. The slags are picked over and washed before treatment.

Conducted by skilled workmen, this rude method produces excellent results. At one place which I visited, sixty per cent. of lead was obtained from an ore containing perhaps seventy or seventy-five per cent. Japanese smelters, however, are rarely so skilful, and the yield is not often so large. Mr. GOWLAND† speaks of works which he visited, where, from ore yielding sixty-nine per cent. by assay, but forty per cent. was obtained ; and at Innai, where metallic lead is used for the extraction of silver, I found, in the simple fusion of this lead with the silver ore, a loss of fifty-seven per cent.

When the lead contains silver, this is separated by a rude cupellation with charcoal on an open wood-ash cupel ; and the resulting litharges are reduced again to metallic lead by fusion with charcoal in a low hearth.

Daira Lead Mines.—These mines, situated in Yamamoto kôri, Akita ken, are probably the most important of the country. They lie near the head waters of the Fujitokawa, a branch of the Noshiro river ; and near the junction of these streams are situated the celebrated Kagoyama smelting works, where the lead from these mines is used in the treatment of the argentiferous copper of Ani. These lead mines were, at the time of my visit, worked by the merchant OHNO ; and with the Ani mines, the Kagoyama smelting works, etc., have since reverted to the Government, and are now under the control of the Mining Office.

The date of the discovery of these lead mines is unknown. More than three hundred and fifty ancient tunnels can now be counted on the neighboring hills, and doubtless the real number is much larger. Within an area of about one and a half square miles, ninety-four different veins are known, twenty-seven of which are now producing ore. These veins can usually be traced for several thousand feet, though the ore bodies do not continue of workable thickness for any great distance. The veins are true fissures, usually one to two feet thick, sometimes larger. With few exceptions, they run east and west, dipping at a high angle (50° to 60° S). The ore is galena, associated with blende, copper and iron pyrite, and other sulphides, and occurs in irregular lenticular masses in the vein rock. These ore bodies are fifty to four hundred feet in their greatest extent, and from two-tenths of a foot to two feet in thickness. The average diameter of these lenticular masses is about one hundred and fifty feet; and the usual thickness three to six tenths of a foot. If thinner than three-tenths of a foot, they cannot be mined with profit ; and, in such case, are followed only for the purpose of exploration.

The vein rock is sometimes quartz, but usually a white porphyry, which is often much decomposed. The veins have often a symmetrically banded structure, with regular seams of ore, pink carbonate of manganese, blende, quartz, etc. Near the surface, the carbonate of manganese is changed into the black oxide. Sometimes the veins are simple fissures in the country rock, containing galena mixed with pyrite and blende, and without gangue.

The country rock is a hard, dark-blue argillite, with beds of sandstone, etc. The strata are sharply folded, the general direction of the axes being north and south, or a little to the east of north. The dips are steep, 45° to 70° toward the east and west.

With these stratified rocks are associated large masses of a white porphyry, similar to the rock filling some of the veins. These apparently occur as intruded masses or dykes, with an east and west direction parallel to the strike of the veins, and across that of the sedimentary rocks. Ore-bearing fissures are found in these masses of porphyry, as well as in the stratified rocks.

The richness of the ore is not known, as it is bought from the miner in the form of nearly or quite pure galena, which has been separated from the gangue and the sulphides by washing. This washed ore yields, in the furnace, about sixty per cent. of lead.

The mines employ at present about four hundred persons, including officers and workmen ; men, women and children. The men earn about eight cents per day, and the women five.

The product for 1874 was about one hundred and five tons (2,000 lb.) of lead. This is below the average, which, in past years, has been about one hundred and thirty tons.

The lead contains 0·075 to 0·1625 per cent. of silver, which is separated at the Kagoyama smelting works.

These mines are admirably managed, and apparently with great economy ; but in spite of this the profits are very small ; and, indeed, were it not for the necessity of supplying the Kagoyama works with lead, it is probable that the mine would be abandoned.

Yurap Lead Mines—Yamakushi kôri, Iburi Province, Yesso. In the course of my work for the Geological Survey of Yesso, I spent some time at these old mines. It was intended to make a careful survey of the region, but the work was interrupted by cold weather, and was not afterwards resumed.

The lead deposits of Yurap bear a striking resemblance to those of Daira. The country rocks are dark blue, slaty rocks and quartzites, much folded, and having a general north and south strike. The stratified rocks, like those of Daira, are traversed by small veins and large dykes of a white porphyry, having an east and west direction. The ore-bearing veins are found both in the quartzite and in the porphyry, and are filled with the same minerals as at Daira —galena, blende, copper, pink carbonate of manganese, quartz, etc. These minerals are here, also, sometimes symmetrically arranged in seams within the vein. Veins containing only quartz and ore, and without gangue rock, complete the resemblance between these and the Daira deposits.

These mines have been abandoned for a number of years ; and, at the time of my visit, I could find no one who was familiar with the old workings. The old stopes which I examined had been exhausted, and I saw little or no ore. Others, who visited these mines at an earlier date, report that they saw ore bodies a few inches to a foot thick.

From the very remarkable similarity between these veins and those of Daira, it is probable that the Yurap mines could be worked, should a necessity here arise for a supply of lead. In view, however, of the fact that labor is much more expensive in Yesso than in Nippon, it is also probable that the profits would be even less than at Daira, though the works should be conducted on the most approved methods.

Other deposits of lead occur in Yesso, but none of importance. At one place the deposits closely resemble those of Daira and Yurap, but the veins are small and not workable.

Towada Lead Mine—Akita ken. This mine was opened some years ago by the Mining Office, with the view of obtaining a supply of lead for the smelting of the Kosaga silver ore. The explorations had, at the time of my visit, revealed no large bodies of ore. A few fine specimens of galena, since divided among the museums of Tokio, constituted, in fact, the total product of the mine. I have lately been informed that this mine is now paying expenses. Larger bodies of ore, therefore, have probably been discovered.

——— *Lead Mine*—Yeichi (?) kôri, Shiga ken. The following notes concerning this mine are condensed from Mr. GOWLAND's description* :

The vein is large and wide, but is chiefly filled with a blue, shaly material, through which the ore occurs in thin, straggling seams, and in irregular pockets, associated with similar seams of calc-spar. The vein has a steep dip; its course, however, and the direction of the dip are not stated. The country rock is a silicious shale, much broken up and decomposed near the surface.

The ore is galena, associated with iron oxide, magnetic and arsenical pyrites, mispickel, and, sometimes, copper pyrites. The ore is poor, yielding, in the furnace, but four to five per cent. of lead. Small quantities of purer galena are sometimes found. A sample of ore of this description, from a seam ten inches thick, gave Mr. GOWLAND, by assay, 69 per cent. of lead, and 125 oz. of silver to the ton. This yielded the Japanese smelters but 40 per cent. of lead.

The mine is worked by levels driven into the hill-side, and is drained in the usual manner. The workings are very irregular. Gunpowder is used only in hard rock. Mr. GOWLAND does not state the yield of the mine, but it is probably not large. The lead produced contains eight per cent. of silver, so that the mine should be regarded as one of silver rather than of lead.

TO BE CONTINUED.

THE DIVINING ROD.

TO THE EDITOR : SIR—I notice in your number of December 9th a communication from Mr. CCGHLAN, concerning the "Divining Rod." It seems to me that this subject is worthy of further consideration. I have never had any faith in the divining rod as a means of discovery of mineral veins, or even of springs. However, having at various times been called upon to investigate its claims and supposed powers, and having made careful tests of its operation in the hands of professed experts, I have arrived at certain conclusions which I will give.

1st. The movements of the divining rod are caused by an attractive power, outside of the person holding it.

2nd. This attractive power may be to a considerable extent controlled, as to its effects on the rod, by the will (or unconscious cerebration) of the person holding it

3d. This attraction seems much lessened by the intervention of a non-conductor of electricity (a glass plate) between the object and the rod.

4th. The idea that the rod will indicate any ores of lead, silver, gold, or copper, in preference to other ores, is a fallacy.

5th. The idea that the "mineral rod," by pointing to the earth, indicates the presence of ores, is a fallacy.

6th. The attraction which affects the divining rod, appears to act strongest at localities when rocks of different kinds come in contact, and appears to depend on some galvanic action occurring along these lines. *This action, however, is the same, whether any minerals are present or not.*

I have also reason to believe this action is strongly shown where any rock is undergoing rapid weathering or decomposition in presence of considerable water, especially in the case of a pyritous rock.

Yours truly,

C. W. KEMPTON.

32 PEMBERTON SQUARE, Boston, Mass.

* Transac. Asiat. Soc. of Japan, vol. III, part 1, p. 87, et seq.

† Mines of Japan, p. 25.

* Quoted by Mr. PLUNKETT, Mines of Japan, p. 25.

FIRES IN MINES: THEIR CAUSES, AND THE MEANS OF EXTINGUISHING THEM.*

By Richard P. Rothwell, Mining Engineer, New York.

(*Concluded from page* 394.)

If the fire has not obtained much headway, and other conditions are favorable, it is possible to extinguish it by this direct application of water, but the cases are not rare where the almost superhuman exertions of experienced men have failed. There remain but two remedies, either to close the entire mine, or to wall off the district on fire.

This latter course is usually adopted as soon as the fire has gained such headway as to satisfy those in charge that its extinction, by throwing water on it in the manner described, will be either impossible or too expensive, if successful. The simplest method is to fill the mine with water, either by allowing this to accumulate, if the mine be a wet one, or, more commonly, by pumping or turning some natural water-course into the shaft. Of course there can be no doubt as to the result of this method. Wherever the water goes it extinguishes the fire. But it may happen that this is in portions of the mine above the foot of the shaft, where the water cannot reach, because the air cannot escape. In this case the fire may long continue to burn, deriving its oxygen from the air compressed in the "rise workings," and when the mine is pumped out, and fresh air admitted, the conflagration may break out again.

Where the fire has occurred from spontaneous combustion, the admission of water sometimes aggravates the trouble, for, though it extinguishes the fire wherever it goes, it leaves in the wet coal-dust a condition of things very favorable to spontaneous ignition, and it not unfrequently happens that, on pumping the water out, fires occur at points where they did not previously exist.

From these and other considerations, it would seem that, in coals subject to spontaneous combustion, drowning out is not a safe or desirable method of extinguishing a fire; but, in nearly all cases where it can be applied, it is the cheapest and most effective means yet adopted.

Where mines are extensive, or where there is a necessity for working the portion not on fire, or where the nature of the roof is such that the admission of water would cause it to fall, as is the case with many shales, it is evident drowning out is not a method that can be adopted.

The system in most general use for extinguishing fires in large mines consists in walling off the portion on fire, trusting to the exclusion of air to secure its gradual extinction. The products of combustion (carbonic acid gas and nitrogen) are most effectual extinguishers, and all that is necessary is to confine them, or, in other words, to exclude the supply of oxygen, when in time the fire must inevitably go out. The time necessary to effect this object depends on the intensity of the conflagration, and the extent of the area inclosed. A mass of coal in full combustion requires a long time to cool below the temperature of ignition; and, even when the fire is actually extinguished, the admission of a little fresh air on the still hot coal is often sufficient to bring about spontaneous ignition. Time must be given for the combustible material, wood or coal, to cool off, before the fenced-off portion of the mine can be opened, and this delay is one of the chief objections to this remedy. To hasten the cooling, and also to hasten the expulsion of the air from the inclosed space, steam, carbonic acid, and the mixture of carbonic acid and nitrogen, known as "choke-damp," have been injected, with greater or less success. The *rôle* of steam appears to be principally as a cooler, and it is probably the most efficient agent that can readily be applied for that purpose, except, indeed, carbonic acid gas were allowed to expand from a state of very high compression (such as liquid CO_2) into the space to be cooled. At the Empire Mine, already referred to, after all efforts to extinguish the fire, by the direct application of water, had failed, a large part of the mine was walled off, and steam, from some sixty boilers, was forced in during many months. When examined some time after closing the mine, the fire was found completely extinguished in those parts where it burned most fiercely when inclosed, but it was thought that it still burned in the higher "rise workings," where the carbonic acid and nitrogen had not had time to accumulate. There was no question but that the steam had acted advantageously, but it is by no means certain that carbonic acid, allowed to expand from a liquid state into the space inclosed, would not have been quite as efficient and economical as the steam.

Where carbonic acid has been tried, as has been done in a number of cases in different countries in Europe, and in some mines in this country, it must be confessed the results have not been very satisfactory; but this is probably due principally to the defective manner in which it was applied, and particularly to the shortness of the time allowed for the cooling of the heated coal. The district on fire should be hermetically closed. If the gas can run out, as it will like water, from the lowest part of the mine, it will of course be inefficacious. In mines it is very difficult to make perfectly tight stoppings, and where the cover rock is broken up to the surface, air obtains entrance, and carbonic acid exit, through innumerable, unnoticed fissures. Moreover, where the fire exists under an accumulation of fine coal and rock, the carbonic acid really does not come in contact with the fire, so that its failure in many cases was probably due to causes which would have prevented the success of other methods; indeed, it has generally been tried only after the failure of everything else. The carbonic acid is usually generated by the action of sulphuric or muriatic acid on marble-dust or limestone, and is somewhat expensive where such large quantities are required. Mr. GEORGE THOMPSON, in a paper read before the British Iron and Steel Institute, gave an interesting account of the extinction of a fire in the Wynnstay Colliery, Ruabon, Wales, by the use of carbonic acid gas. The following is a description of the apparatus employed for the production of the gas:

"Two strong wooden boxes, 6 feet square by 2 feet deep, were provided, and lined with sheet lead to resist the action of the acid. Pipes with taps were fixed into the upper side of the box, and man-lids were provided, the latter for charging the box with limestone, the former for introducing the acid. Pipes with plugs were also fixed into the bottom of the box for the purpose of discharging the residuum, chloride of calcium, after the decomposition of each charge. Two cast-iron pipes, with separate valves and also a valve common to both, were connected to the box to convey away the gas as it was produced. Small pipes, provided with taps, were inserted for allowing the air to escape, and also for attaching a mercury gauge during the operation, to indicate the pressure of the gas. Whilst one box was giving off gas, the other was being charged, so that a continuous flow was kept up.

"The charge used was about 4¼ cwt. of limestone, broken very small; and the 'man-lid' being fastened down, the hydrochloric acid was poured in, and the mercury gauge watched so as to keep the pressure tolerably equable, usually about 3 inches of mercury. We found, generally, that 120 gallons of the acid, of 1.12 strength, decomposed the charge of limestone, which, by calculation, gave us about 12.0 cubic yards of gas. The gauge indicated when the charge was exhausted, and then the valves, etc., were shut, and the residuum withdrawn, and thus the operation was repeated alternately as long as needful. Altogether we put down about 6,000 cubic yards of carbonic acid gas, and we believe that it had a very important effect. The gas collected from all the pipes through the different stoppings from time to time would not support combustion, and the temperature within the stoppings continued very moderate. It may be interesting to state here that, in analyzing the gases within the stoppings, we found that a mixture of 5 per cent. of carbonic acid, with 25 per cent. of atmospheric air, and 70 per cent. of carburetted hydrogen, extinguished flame instantaneously. On adding more air to the mixture, and applying a match, it would not explode, but when pure oxygen was added, and a match applied, the mixture exploded gently. Further, when this gas was deprived of the carbonic acid by means of caustic soda, and a match applied, it would burn when issuing into the open air."

Carbonic acid or choke-damp may also be produced by passing air through a bed of incandescent coal, mixed with limestone, of such a depth that the oxygen of the air will all be converted into carbonic acid, and not into carbonic oxide. The depth of the bed of coal to effect this purpose will be about 14 or 15 inches, and the greater the proportion of carbonic acid the better. If too little air is admitted, the gas formed may be in large part CO, but even a very small percentage of CO_2 will render this incombustible, mixed as it is with a large proportion of inert nitrogen. The application is quite similar to that of carbonic acid made from limestone and acid, with the additional drawback that it usually enters the mine hot, and therefore effects nothing as a cooling agent.

To sum up, the records of a great number of fires, and of more or less successful efforts to extinguish them, seem to justify the conclusions that the use of the portable extinguishers is sometimes advantageous in extinguishing mine fires before they have attained much headway, that water under a heavy pressure is a much more efficient agent, and with energy and experience on the part of those using it, can be relied on to conquer, in most cases, when applied promptly and continuously. When the fire has gained such headway that it cannot be extinguished in this way, the burning district should at once be walled off, and the admission of air excluded. Carbonic acid or steam, or both, may then be blown into the inclosed space with advantage, steam being the most efficient cooling agent, and carbonic acid the best extinguisher. Neither the one nor the other can effect the extinguishment, except the admission of air be carefully avoided. When a mine is small, and the nature of the roof such as will not be much injured by water, and when the coal is not subject to spontaneous combustion, the quickest, cheapest and most reliable method is to fill the mine with water, and pump it out again.

By reason of the numerous modifying conditions which must be taken into account in each special case, it would be simply absurd to prescribe any one method as applicable in all. The best means to employ to extinguish a mine fire can only be determined after the most careful examination and study of the local conditions, and the object of the present paper has been simply to point out the means that have been adopted, with more or less of success, in cases where the conditions have been those common in mining regions. It is safe to say that none of the chemical nostrums that are proposed from time to time by persons not familiar with mines are of any practical value whatever.

* A paper read before the American Institute of Mining Engineers, at the Washington meeting, February, 1876.

BLOWING AND VENTILATING MACHINES AT THE PHILADELPHIA EXHIBITION.

Special Correspondence of the Engineering and Mining Journal.

THE STURTEVANT BLOWER.

A very complete exhibit of these blowers is shown in the Hydraulic Annex to Machinery Hall. Under Mr. STURTEVANT'S direction, the old-fashioned, roughly-constructed centrifugal fan-blower has been so improved and modified that it often proves a successful rival to the air and gas forcing machines working by piston compression.

The construction of the centrifugal blower is exceedingly simple, consisting, as it does, of a radial wheel provided with blades, all of which revolve in a casing having central openings on either side, by which air is admitted to be acted upon by the fans. This casing is made with a constantly increasing space outside of the fans into which the air is driven, and which terminates in an orifice for the discharge of the air.

Mr. STURTEVANT makes two general kinds of blowers, which he designates as pressure and fan blowers. In principle they are the same, but in construction they differ somewhat. The pressure-blowers have small openings for the admission of the air in proportion to the area of the fan-blades, and are usually driven at very high rates of speed. The cases in which the fans revolve are flat cylinders surrounded by an increasing tubular reservoir, into which the air is thrown by the revolving fans. The discharge is generally horizontal, and at the bottom of the case. Side plates which bolt on permit the removal of the fans. The shafts used to turn the fans are made of cast steel, tapering up from the ends to where the hub is put on. The hub and arms to the fan are generally made of bronze, and in some special cases of steel. Each fan blade is carried by a separate arm, and is shaped like a keystone, the narrow end being outward. Two thin composition plates are placed around the sides of these fans, so as to inclose them, leaving only opening for the passage of the air from the center to the exterior of the casing. These side plates around the fans are turned off so as to make tight joints with the case where the air enters the blower. By this means the escape of air at these places from the interior of the blower, when under considerable pressure, is in a great measure prevented. This plan of making an enclosed fan within the casing, and having tight joints with the casing where the air enters, is one of the most important improvements which has been made in fan-blowers. The high velocities at which fan-blowers have frequently to be driven render necessary that all the moving parts should be carefully balanced, and that the journals should be strong and self-acting. The Sturtevant fans are all carefully balanced after being carefully put together by adding small pieces of metal to them where a deficiency is shown. The steel shafts run in long boxes lined with Babbit metal, which are held in three-armed hangers, bolted on each side of the blower case. The two driving pulleys which are screwed on the shaft are enclosed by these hangers. To take up all lateral motion in the shaft, set screws are placed in the ends of the journal boxes, which, instead of being directly against the ends of the shaft, are screwed up against an intermediate steel washer, which turns a pulley, or, if stopped by some obstruction, permits the end of the shaft to turn upon it. The self-oiling apparatus which is attached to the journal, consists of a two-bulbed reservoir, hanging vertically at the ends of the shaft. The upper reservoir, which is filled with oil, has leading from it two channels, one passing along the top

of the journal, which has three openings for admitting oil to the shaft, while the other passes along on the lower side of the journal, so as to admit oil from below. The waste oil collects in an annular opening at the inside ends of the journal boxes, and flows back to the lower reservoir, from which it can be drawn off. When running properly the oil does not become colored at all in its passage through the boxes. In driving the fans the counter-shaft pulleys are never put directly over the pulleys of the fan, but either in front or behind them. By this arrangement any small amount of slackness in the belts is readily taken up by means of a screw and wheel which moves the blower backward or forward over its bed-plates.

These pressure-blowers are made in ten principal sizes, the smallest of which, when making 4,135 revolutions per minute, is guaranteed to deliver 324 cubic feet of air at a pressure of 5 ounces per square inch; and the largest, when making 1,815 revolutions per minute, will deliver 8,880 cubic feet per minute at 1 lb. pressure per square inch.

The smaller sizes of these pressure-blowers are generally used for driving forge fires, and the larger ones for iron-melting cupolas, which require considerable pressure to the blast. Experience has shown that where proper care is used in setting these blowers and fitting up the counter-shafts and pulleys, they will run continuously for long periods without any repairs. This is due to the lightness of the moving parts, the small strain to which they are individually subjected, the almost entire absence of frictional-bearing surfaces, and to the very careful construction of all their parts.

The fan-blowers are made to drive or draw air or other gases at lower pressures than is necessary when the pressure-blowers are used. The form of the fans is essentially the same as those used in the pressure-blowers, the sides not being turned up, however, so as to closely fit the edges of the casing. The opening for the admission of the air is made large, while the air space around the fan is not proportionally as great as in the pressure-blowers.

The fan shafts run either in plain journal boxes with closed outer ends, against which the shaft bears, or they are fitted with the set screw adjustment generally used on the pressure-blowers. In order to adapt these blowers to special uses, several different kinds of casings are made by Mr. STURTEVANT. One of these has two discharge openings at opposite points on the periphery of the casing, so that separate portions of the blast can be conveyed away for different uses. Another form made for exhausting has one side of the casing entirely closed, while the other has a flanged opening, to which the exhaust pipe can be bolted.

FOR DRYING LUMBER, ETC.

The air is conveyed through the tubes of a tubular reservoir, which is directly bolted to the inlet flange of a blower such as last mentioned. This reservoir is kept filled with steam, either direct from a boiler or from the exhaust of an engine. Several of the blowers fitted with this air-heating apparatus are shown in Shoe and Leather Annex to Machinery Hall. Large sizes of the plain fan-blower are made for mine ventilating purposes. One of these is kept in operation at the Sturtevant Exhibit.

THE KEYSTONE BLOWER.

The exhibit of these blowers which is made by the Keystone Portable Forge Company is in Annex No. 1 to Machinery Hall. The pressure blowers made by this company differ from those made by Mr. STURTEVANT in having a spur or cut-off on the ends of the fan-blades and flanges fastened on the sides of these spurs. The bearings for the fan-wheel are also made so as to run without oiling—a dry antifriction composition, said to be metaline, being used to line up the bushings of the bearings. The exhaust-blowers are made after the same plan as these pressure-blowers, except in admitting air to only one side of the fan through a flanged opening.

The ordinary fan-blowers are run with dry bearings, like those used in the pressure-blowers. In respect to workmanship and design, the blowers exhibited seem to be well and thoroughly made, and are to be ranked among the best which are constructed on the centrifugal principle. A more detailed description of these blowers, with illustrations, will be found in Vol. XX. ENGINEERING AND MINING JOURNAL, page 595.

THE HAWKINS BLOWER.

Several of these blowers are shown in the Hydraulic Annex to Machinery Hall. These are simply fan-blowers, not intended for producing any considerable pressure. The fan-blades are not set radially on the spider arms, but incline outward in the direction opposite to that in which they turn. The spider frames are made in bronze.

THE UNION COMPRESSOR.

This machine is made by the Union Rock Drill Company of New York. The compressor which this company exhibit in Machinery Hall has two air cylinders and one steam cylinder placed vertically on a bed plate, the steam cylinder being between the two air cylinders. A three-cranked shaft mounted on standards serves to communicate the power from the engine to the compressing cylinders. The steam cylinder is twelve inches in diameter, and has sixteen inches stroke. The valve is of the ordinary slide variety, worked by a single eccentric. The air-compressing cylinders are 14 inches in diameter and 14 inches stroke, and are single acting, compression taking place on the down stroke of the pistons. No top cylinder head is used. Two inlet poppet valves are placed in each piston head, and at the bottom of the cylinder similar valves opening downward serve to discharge the air after compression. The air cylinders and pistons are prevented from becoming overheated by the compressed air by means of water packing. In this way the air is not brought in contact with the water, as in the Burleigh Compressor. The water used in the Waring Compressor for this purpose is run in upon the piston heads, and is prevented from entering the cylinders on the down stroke of the pistons by collars which surround the valve seats and which are several inches high. The excess of water at the end of each full stroke is removed through a series of holes at the tops of the cylinder which communicate with the water space around the cylinders.

PHILADELPHIA, October 31.

CRISMON MAMMOTH GOLD AND SILVER MINE.—Two rich strikes are reported in this mine, located in the Tintic District. One is in horn silver, assaying between $1,000 and $1,200 to the ton, the other is a gold strike, sixty feet nearer the surface, and in a line with the first body of gold ore discovered in the mine. It is stated that the gold ore assays from $2,500 to $7,000 per ton. The owners are at work putting up a five-stamp mill, which will be in operation in the course of a few weeks. It is rumored that the company has also got control of the old Germania Smelting Works of Tintic, and will soon begin the reduction of its copper ores, of which there are great quantities in the mine. Timbers for re-timbering the mine, and putting it in condition, have been sent for to Truckee, and the developments in the property from this time forward will be made with a view to permanency.—*Salt Lake Tribune*, Dec. 16th.

ABSTRACTS OF LECTURES ON MINING.—No. XXII.

By Prof. W. W. Smyth, M.A., F.R.S., Royal School of Mines, London.

(*From the London "Mining Journal."*)

IN this lecture we have to consider a branch of our subject which often comes into play as a preliminary to actual underground work, but which also has of itself a high degree of importance—that is, the working in open works or quarries. It is commonly the case that the term quarry is applied to the working of substances of a non-metallic character in open works. In some cases the preparatory work of a mine may be the opening out of the ground from the surface downward by daylight, and this is the method which we learn from old books and from relics of ancient workings left, was very largely employed in particular districts in former times. In Derbyshire and Cornwall open works have been carried down to a depth of many fathoms, where the walls were strong enough to support themselves. The ancient workings in the district between Castleton and Matlock, a district seamed with veins of lead, were of this character. As examples of these works on a large scale we have in our own country the tin works of the Carclaze Mine, in Cornwall, and the copper works of Parys Mountain in the Isle of Anglesea, and similarly in Scandinavia, in the working of deposits of copper ore and magnetic iron ore. In the latter case, when depths of from 200 to 300 feet have been attained by open working, regular mining operations are commenced by means of shafts and levels. Open casts of a somewhat different class are those wrought at the surface, or at some little distance from the surface, for getting a class of mineral which cannot be conveniently worked by narrow excavations. Thus, at the outcrop of some mineral veins in the North of England, the proprietors of certain ironworks some years ago introduced a system of open working for getting the chalybite associated in Weardale with the lead ores; by removing a considerable portion of the limestone intersected by these veins, so much of the chalybite could be worked as to make it profitable. Some of the most striking series of excavations of this kind may be seen abroad, where it has been the intention either to work the whole deposit downwards by open workings, or only as a preliminary to underground working, as in Scandinavia. In the East of Europe relics of ancient Dacian and Roman excavations for gold, worked probably about the time of TRAJAN, are now standing as mere skeletons of former hills, pierced and excavated in various directions by the galleries of these ancient people. These may especially be seen in the neighborhood of Zalathna, where the name of *Cselatye* (meaning castle) is applied to them. Perhaps some of the most striking works for metallic substances are open casts, which occur in great number in the deep valleys of the South Wales coal field. The system has been carried out for working the deposits of bedded iron ore, and the nature of the country gives a great amount of facility to this plan of operations. The large scale of the ironworks in the northern part of the field is principally due to the facility and cheapness with which the iron ores have been obtained. One element of cheapness lies in the fact that by a moderate amount of cutting overhead on the face of the hill where the deposit is to be worked you can get a floor round the face on which the wagons for the removal of the material can run. For in this class of working a very important point is that of being able to remove the over-burden with facility. Another example is that of working the ironstones at the outcrop of the carboniferous beds on the western side of the Derbyshire and Yorkshire coal field; it is very advantageous to work these as open quarries, especially if you are able to drain them into a valley below.

In a civilized country, where the surface is of considerable value, there is usually a stipulation made with the owners that the vegetable soil, or meat earth, should be pared off, and placed in a suitable position to be spread over again when the works are concluded, and the ground made level again as far as possible. In certain uncivilized countries there would be nothing of this kind required. The covering ground which yields no mineral is removed by some arrangement with the men at so much per cubic yard. It is stipulated that the waste shall be shot back, and go towards filling up the excavation. Great precautions are necessary in order to avoid as much as possible the results of sudden falls of portions of the sides of the working. The material to be worked—ironstone—is picked out from the masses brought down, and is then carried to the surface, and stacked till it is properly weathered, and a small and readily moveable engine will probably be employed in drawing the wagons full of waste material up to the top of the rubbish heaps, in order to be emptied there. We may compare this with another class of open work—stream works, for gold in California and some newly colonized countries, and which have been very important for tin in Cornwall, Saxony, and parts of Spain. These stream works may be met with sometimes in valleys, sometimes passing over hills, and depend upon a former condition of the surface in ancient geological times. As a general rule the materials are seen to have been brought down from the country, and many show signs of being waterworn. These works are very simple where you have only to strip off the vegetable soil, perhaps 1 or 2 feet of peaty soil, and a little gravel or sand, making altogether only from 6 to 8 or 10 feet, before you come down to the gold or tin ground, which in itself may be only a few inches thick. In the south and central parts of Cornwall you meet with this class of works—in the neighborhood of St. Austell and in the district between Redruth and Helston—which have no great amount of success, being carried on mostly by miners at odd hours, or by old men who have an objection to work underground. From these shallow workings you may pass to cases where the mass of material is from 30 to 40 feet in depth, but where, nevertheless, if it be of a soft character, it may be worth while to remove the whole of it, and then, according to the nature of the deposit, you may have to follow it down to considerable depths. Thus, in gold stream works of Victoria, in Australia, it was at first thought a great depth to get down to 60 feet, but afterwards, in the district of Ballarat for example, the workings were carried through a series of beds of basalt, clay, etc., to a depth of 200 or 300 feet. In the latter case, of course, you cannot employ the same method of opening works as before, the quantity of dead material to remove would be far too considerable, and the character of the works must therefore approximate to that fairly called mining—by the sinking of shafts and the driving of levels.

As an example of the method of these workings we may take the case of the tin workings in the Pentuan valley, near St. Austell, Cornwall, a place also exceedingly interesting from the geological features it presents. An account of it will be found in the "Report on Devon and Cornwall," by Sir. H. de la Beche. The work has been carried up from the sea-shore a distance of about a couple of miles, and the lecturer had an illustration of it taken when he saw it some dozen years ago, about 1½ miles from the shore. The tin deposit is some considerable distance below high-water mark, and even below that of low water. In some of the overlying beds may be seen piles of timber driven in in former times, as if forming part of an old bridge; below those came a bed

containing some stumps of trees, and also much drift wood; lower down still a human skull was found, and below that again the remains of an ancient forest, succeeded by the tin beds. The series shows what remarkable changes have taken place even since man became an inhabitant of the district. The floor of the whole on which the tin-bearing beds rest is clay-slate, called the shelf. The ground is laid out in a series of steps, on the upper step the vegetable or meat earth is taken off, as before described, then the ground below down to the tin beds is worked by steps, a set of men working at the same time on each step. The material will be removed, according to the scale of the workings, by wagons drawn by horses, or by hand barrows, and carried backwards to be thrown in on the waste heap behind the workings, which goes towards filling up the excavation. For the purpose of securing the drainage of the ground a single shaft is sunk some distance down the valley, and supported by timber or stone work, and the water is pumped out by means of a wheel. A culvert is kept open beneath the rubbish heap behind, in order that the water from the works may drain down to the shaft. The stream ground having been exposed in this manner, will be examined and dug by the streamers. These works were very successful when they came to those parts which had not been previously streamed by the old men; but it appeared that a great part of the valley had been so worked that these later works were obliged to be closed. In some instances stream works, both gold and tin, which have been closed for a time have been re-opened with success; and many curious theories have been founded on it as to the "growing" again of the mineral, or, in a more scientific way, as to a fresh deposition of the minerals from certain solutions. There is, however, another way of explaining this—by the further decomposition of the rock stones which we know contain the mineral. This method of work, however, is very expensive, especially if there is a large quantity of overlying material to remove; so in the California districts the Americans found that this method would not pay when they had to remove 100 to 120 feet of gravel, sometimes cemented by oxide of iron. They consequently introduced the system of hydraulic mining, which has proved an extraordinary success. In the commencement of the workings large amounts were subscribed for cutting water-courses, in order to bring the water from the high grounds to the parts where its power would be required. The water is then brought down from the flumes by means of a sheet-iron pipe into a cast-iron box, or chamber, placed on the floor of the quarry or working. and thus a pressure of from 60 to 140 feet was obtained. There are a series of valves in the box, which can be opened so as to admit the water into flexible pipes, the latter being generally made of canvas, strengthened at intervals of 2 or 3 inches by iron hoops, or by a net-work of cord. The pipes end in a nozzle, like that of a fire-engine, with a diameter of 2 to 3 inches, and a jet of water can thus be brought to play on the face of the gravel which has to be brought down, and through which the gold is disseminated. The breaking of the ground may be assisted by putting into the rock a few shots here and there, but the main part of the work will be done by one, two, or more of these jets. The material will be swept by the water into a series of troughs, which contain stops in places behind which the heavier materials accumulate. If the face is only 60 or 80 feet high it may all be worked at once, if it amounts to 100 or 140 feet it is usually worked in two stages. The following details are taken from the report of one of the inspectors appointed by the American Government. Taking the average wages of a man at $4 per day, the cost of working a cubic yard by the old process of the pan would be $20; by the rocker or cradle, $5; by the improved form of dressing apparatus, called the "long tom," $1; by the hydraulic system, $0.05. In one claim—the Eureka—where four jets, with a total delivery of 208 gallons per second, in 10 days 36,500 cubic yards of gravel could be worn away. The cost of the water for this amount was $1,000; labor, $173; sundries, $100; total for 10 days cost, $1,273. The value of the gold derived from the working of this quantity, of course, varied, but for a considerable time it was said to be $6,000, leaving, it will be seen, a very large margin for profit. It is only in cer ain distrists, like that referred to, that this system could be employed; in inhabited countries the people in the lower districts would object to having these mountains of gravel swept down into the rivers.

We may next pass to a class of work of a great deal more importance in this country than anything connected with the precious metals, that is the quarries, among the most remarkable of which are the slate quarries of North Wales. In quarrying it is always desirable to arrange the work in a series of stalls, so placed that the men may be associated in groups, in order that small quantities of material may be thrown down without interfering with the whole of the men at once. In some cases the rock is traversed vertically or horizontally by joints, and then the arrangement of the work will generally follow that of the joints. A Prussian mining officer, who was over here a short time ago, and who had visited all the slate mining districts of Europe, said that the total quantity of slate yielded by France, Germany, and Belgium amounts only to half that yielded by England and Wales. The quantity estimated by Mr. R. HUNT as produced annually is 542,000 tons for England, Wales, and Scotland; the proportion yielded by Wales alone amounting to no less than 470,000 tons. As a general rule it would look at first sight that the cutting down of a mountain side in a slate quarry was as simple a matter as the working of the other materials referred to. In the district of Caernarvon rocks are worked into a form which leaves much to be desired. You may ascend a hill-side, and find that one adit level (so to speak) after another has been driven into the hill—locally termed tunnels—and then on reaching the hill-top you find yourself at the edge of a terrific precipice 200 to 300 feet in depth. Owing to the fact that the cleavage here is nearly vertical, large masses are liable to break away from this great face of rock, and endanger not only the lives of the men, but also the existence of the quarry, masses of 5,000 tons, and sometimes considerably more, falling away occasionally. And this is rendered still more difficult by the fact that the men are still working down below the adit level with engines for pumping. It would be very desirable to introduce some method which should avoid these dangers. Perhaps the best example of the opposite system is to be seen in the Bethesda quarries, near Bangor, where the quarry ground is carefully cut away, so that from the top of the mountain to the bottom of the quarry there is a series of steps. Each of these steps carries a railway, constructed on a plan which will readily enable the rails to be taken up and replaced as the work progresses onwards, a means of communication being established by means of an inclined plane on which the full wagons in running down pull up the empty ones. In this grand quarry—one of the grandest sights in the world—you have a series of 15 of these steps, each about 54 feet in height, the number of persons employed being about 3,000. This method of step working is that which one endeavors to see carried out as far as possible in all cases, for should a fall take place, instead of the whole workings being encumbered, there will probably be only one step, or two at the most, affected, except in the case of large and unavoidable slips. A great deal will depend on the manner in which the slates dip; if they dip away from the hill side the water is apt to collect in the works, and the slates have to be conveyed over the jagged edges of the beds, whereas if approached in the opposite direction the water will not be so apt to collect, and there will be an inclined plane by which to slide the slabs down.

NOTES.

THE WURTLAND, KENTUCKY, COAL MINES continue their operations with renewed vigor, having increased their output to 20,000 bushels per week, and are not yet able to fill orders as fast as they come in.

NEVADA COAL DISCOVERY.—A four-feet vein of coal has been discovered in the hills between Canyon Creek and Paradise Valley, at a point about twenty miles from the head of the valley.—Winnemucca *Silver State*, Dec 5.

ILLINOIS MINING INCORPORATIONS.—According to the recent report of the Secretary of State, there have been issued during the past two years in Illinois 46 certificates of organization and incorporation to mining companies.

THE PAY ROLLS OF THE COMSTOCK MINES FOR NOVEMBER for labor alone are reported as follows:

Consolidated Virginia	$48,791.75	California	$40,710.25
C. and C. Joint Shaft	14,240.00	Mexican	4 224.00
Ophir and Union Consolidated	57,000.00	Belcher	42,000.00
Crown Point	20,000.00	Yellow Jacket	16,000.00

THE HEGIRA COPPER MINE is located in Tehama Canyon, Nevada, some six or eight miles from Mill City. The ore is principally black or red oxide of copper of a high grade. The vein is from four to seven feet thick, and is encased in talcose slate on one side and porphyry on the other, and runs almost due north and south. It is very favorably located for working, and is being prospected by a tunnel which starts on the ledge at the foot of a steep ridge. In running this tunnel a few feet, some four tons of ore containing about 40 per cent. metal, was extracted. The owners intend to continue the tunnel along the ledge into the mountain, and if the ledge continues good, ship the ore extracted to San Francisco.

THE BETTS COVE, NEWFOUNDLAND, COPPER MINES have shipped during the past season about 20,000 tons of 10 per cent. copper ore to Swansea, at an average freightage of about 20 shillings per ton. The subject of the rapid development of copper mining in Newfoundland is attracting much interest in some quarters in England, particularly as regards the copper mining interests in Cornwall. The increased expense from the great depth at which these mines are now working and the small percentage of copper (not over 6 or 7 per cent. to the ton) found in the ore, leads to the impression that, with the increasing influx of Newfoundland ore, its facility for being worked so near the surface and yielding estimated at from 15 to 25 per cent., the Cornwall mines will in time have to be wholly or in part abandoned. Such a change would be of vast interest to Newfoundland, as it would give plenty of experienced miners, which is about all that appears to be wanted by the English parties represented as about to engage in extensive mining operations in Newfoundland.

THE NORTH CONSOLIDATED VIRGINIA GOLD AND SILVER MINE is situated on the Comstock Lode almost adjoining the Mexican, a few hundred feet to the north and east of the Ophir Mine. For several years past the location has been acknowledged by the mining experts of the Comstock to be one of the best on the north end of the ledge, and it has generally been conceded that only the attainment of depth was necessary to develop a first-class mine. The shaft has now attained a depth of 1,150 feet. While doing this, a considerable quantity of water was encountered; so much in fact, that it was found necessary to erect heavy substantial pumping machinery. To save a portion of the heavy water lift, a drain tunnel was run into the side of the mountain, which tapped the shaft at a depth of 170 feet below the surface, saving the cost and wear of one set of light pumps. A powerful engine and other necessary machinery was erected, and 12-inch pumps placed in the shaft at stations 200 feet apart down to the 900-feet station. This machinery is amply able to drain any ordinary flow of water to a depth of 1,800 feet. A short time ago the hoisting engines were given an overhauling, and placed in the best of repair for a good winter's run. These engines are powerful enough to sink the shaft and do the necessary hoisting to a depth of 1,600 feet or more. In addition to this the hoisting works building has been considerably enlarged, and air compressors erected, so that all the drilling and blasting required in the mine is now done by the use of compressed air, which is a vast saving over the cost of hand labor. At the depth of 1,100 feet a well-arranged comfortable working station has been opened and two drifts started to cut the ledge. These drifts will open the ledge at a point about 1,100 feet north of the Ophir's north line, in entirely virgin ground; in fact at a point where the Comstock has never yet been prospected, and the developments soon to be made are being looked forward to with deep interest, not only by the stockholders, but by the leading mining men and experts of the Comstock ledge. The streaks of quartz and ore found in sinking the shaft, and the formation of the material penetrated, are, so far, of the most favorable character.—*Gold Hill News.*

THE BALTIMORE CONSOLIDATED GOLD AND SILVER MINE is located on the Comstock Lode. Everything is in the most complete working condition from the surface of this mine down to the 1,450 feet level, the lowest point now opened. At the 1,050-feet station a drift has been run 200 feet to the eastward, at which point drifts were started both north and south, each following the west wall of the ore vein. The south drift has penetrated a distance of 300 feet, and the north drift 475 feet. In advancing, the north drift struck a small vein of very rich ore at a distance of 200 feet from its starting point. This vein has been developed in a north and south course for a distance of 300 feet or more. It is well defined, has a regular pitch of forty-five degrees, and ranges from a few inches to several feet in thickness. The ore is rich, in many places very rich. Near the place where the vein was first struck an upraise has been made, which is now up a distance of 200 feet, the sides of which show the ore streak every foot of the way, and is still carrying the ore in the face as it progresses upward. This winze will have about 100 feet to yet run to reach the 800-feet level. One hundred feet to the northward another raise has been made, which has prospected the ore a distance of sixty feet, developing some fine bunches of ore, but no large paying body. At a point about 200 feet north of where the ore was first struck a winze was started downward on the ore. This winze is now down eighty feet, the bottom in a highly improved character of quartz and ore. The vein of ore has therefore been laid bare a length of 300 feet, and has been prospected by the upraise above the 1,050-feet level, and the winze below a distance of nearly 300 feet following the inclination of the ledge. The quartz is full of life, and many of the assays reach into the thousands. An average of all the assays made since the discovery was first made will reach about $70 per ton. The perfect regularity of the ore streak, the clay walls, and the fine character of the ledge material between the walls, are positive proofs of the continuation and perfection of the ledge that no judge of the Comstock vein can deny, and although no paying bodies of ore have yet been developed, the present developments on the 1,050-feet level cannot be looked upon in any other than the most favorable light. On the 1,450-feet level a drift has been run 300 feet eastward from the main incline, cutting through the clay wall of the ledge. At that point a drift has just been started northward to prospect the vein and connect with the winze now being sunk below the 1,050-feet level. At the same time the main cross-drift will be continued to the eastward, and in a very short time another drift will be started south along the west wall of the ledge to prospect the vein in that direction. So far as yet ascertained the ledge formation on the 1,450-feet level is showing improvement over that of the level above, and the belief is gaining strength every day that prospects so continuous and favorable must and will, at no distant day, develop into a bonanza second to none on the Comstock. The chances are certainly as good as any that appeared in the Consolidated Virginia mine from the 700 down to the 1,100-feet levels before their rich strike was made.—*Gold Hill News*, Dec. 11.

STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative Statement for the week ending Dec. 16.

Tons of 2,240 lb.	1876. Week.	1876. Year.*	1875. Week.	1875. Year.*
Wyoming Region.				
D. and H. Canal Co.	34,860	1,932,666	58,820	2,952,300
D. L. and W. RR. Co.	62,031	1,910,037	38,117	2,880,797
Penn. Coal Co	23,112	1,059,326	25,501	1,319,088
L. V. RR. Co	32,010	927,189	13,888	9 9,469
P. and N. Y. RR. Co.	1,099	25,483	672	87,243
C. RR. of N. J	33,709	1,327,451	50,089	1,461,159
Penn. Canal	—	407,522	—	299,267
	186,821	7,599,674	187,087	9,909,323
Lehigh Region.				
L. V. RR. Co	63,442	2,747,193	66,619	2,196,718
C. RR. of N. J	27,595	1,354,531	29,652	803,693
D. H. and W. B. RR.	848	40,830	782	68,698
	91,795	4,142,557	97,053	3,069,109
Schuylkill Region.				
P. and R. R. RR. Co.	99 140	4,796,071	99,378	4,732,785
Shamokin & Lykens Va.	13,527	925,540	6,172	1,178,168
	112,667	5,721,611	105,550	5,910,953
Sullivan Region.				
Sal. and Erie RR. Co.	247	30,436	1,279	13,791
Total	391,530	17,494,278	390,969	18,903,179
Increase	561	—	—	—
Decrease	—	1,408,901	—	—

* Year beginning January 1st.

The above table does not include the amount of coal consumed and sold at the mines, which is about five per cent. of the whole production.

The decrease of shipments of Cumberland Coal over the Cumberland Branch and Cumberland and Piedmont Railroads amounts to 475,441 tons, as compared with the corresponding period in 1875.

Belvidere Delaware RR. report.	Week.	Year 1876.	Year 1875.
Receipts of coal at Coal Port (Trenton)	89,292	718	198,391
" " South Amboy	17,094	445,277	280,077
Shipments at Coal Port (Trenton)	346	284,423	195,362
" South Amboy	12,518	487,060	330,121

Perth Amboy business:

	Tons.
Received for the week	30,927
Shipped for the week	19,837
On hand Dec. 16	80,448

Receipts of Coal at Boston, for the week ending Dec. 15, and years from Sept. 1, 1875 and 1876.

From	Week. Tons.	Previously. 1876. Tons.	1875. Tons.
Alexandria and Georgetown	1,710	16,560	44.317
Philadelphia	10,132	282,544	295,071
Baltimore	1,884	48,890	50,984
Other places	7,408	97,974	121,085
Great Britain	....	1,959	704
Nova Scotia	....	13,348	11,868

Coal Shipped at Pictou, N. S., for week ending Dec. 9, 1876 ..... 2,056 tons.
Previously exported, since Jan. 1 ..... 171,187 "
Total to date 173 243

The Production of Bituminous Coal for the week ending Dec. 16, was as follows:

Tons of 2,000 lb., except where otherwise designated.

Cumberland Region, Md.	Week, Tons.	Year, Tons.
Tons of 2,240 lb	26,146	1,764,108
Barclay Region, Pa.		
Barclay RR., tons of 2240 lb	8,543	343,958
Broad Top Region, Pa.		
Huntingdon and Broad Top RR	3,695	155.114
*East Broad Top	1,240	63,287
Clearfield Region, Pa.		
*Snow Shoe	937	48,130
*Tyrone and Clearfield	30,156	1,118,040
Allegheny Region, Pa.		
*Pennsylvania RR	3.538	197.546
Pittsburgh Region, Pa.		
*West Penn. RR	2,913	188,706
*Southwest Penn. RR	1,176	53,933
*Penn. & Westmoreland gas coal, Pa. RR.	19,357	833,386
*Pennsylvania RR	6,943	286,497

* For the week ending Dec. 7.

The Production of Coke for the week ending Dec. 7.

Tons of 2000 lb.	Week.	Year.
West Penn. RR	1,127	50,787
Southwest Penn. RR	9,714	496,543
Penn. & Westmoreland Region, Penn. RR.	1,953	55,202
Pittsburgh, Penn. RR	3,623	149,215
Total	16,417	751,747

COAL TRADE REVIEW.

NEW YORK, FRIDAY EVENING, Dec. 22, 1876

Anthracite.

THERE has been no change in the wholesale trade, although the cold weather has benefitted retail dealers. The whole attention was given to the auction sales, which show but little change from those of a month ago; one showing a slight decline, and the other a small advance. In the best of times but little business is usually done immediately before or after the holiday week.

The Pennsylvania Coal Company had announced to sell at auction 80,000 tons of coal on the 20th inst. The sale started according to announcement, and the bidding pointed to very low prices; whereat, Mr. HOYT, the Vice President of the company, in a few remarks, intimated that he would withdraw, after the first privilege, the balance of the coal, if the bids were not satisfactory. This intimation had a very good effect and imparted considerable strength to prices, and the following quantities of coal were sold at the accompanying average rates, compared with those of November, upon the basis of delivery from Weehawken:

Tons.		Prices Dec. 20.	Prices Nov. 21.
3,000	Steamer	$2 82½	$2 85½
17,850	Grate	2 82½	2 82½
5,000	Egg	2 82½	2 79
63,400	Stove	3 44	3 49
8,000	Chestnut	3 08½	3 78
97,250		$3 24½	$2 99

The average was increased this sale by the very large proportion of stove coal sold. This shows the lowest prices at which this company has sold coal.

The Delaware, Lackawanna and Western Railroad Company's sale, which took place yesterday, showed an improvement as compared with its sale of November. This, perhaps, was owing to the small quantity of coal offered, which, apparently, was required by the trade. The following quantities were offered, and average prices received, in November:

Tons.		Prices Dec. 21.	Prices. Nov. 22.
6,000	Steamer	$2 85¾	$2 77½
8,000	Grate	2 82¾	2 69½
6,000	Egg	2 90½	2 67½
25,000	Stove	3 65¼	2 58
5,000	Chestnut	3 20¼	3 27
50,000		$3 30½	$3 09

The bulk of the coal purchased at both of the sales was bought for re-sale, and has not really benefitted the market much, making simply a change of sellers. Were it not that retail dealers had purchased heavily earlier in the season, believing that prices were at their lowest, there would be no difficulty in disposing of, at a good profit, the coal purchased by middlemen under the assistance of the cold weather that we are now experiencing, and that which we have already had. As it is, there will probably be but a moderate market. The Pennsylvania Coal Company and Mr. A. S. SWORDS continue to quote Pittsburgh coal openly as follows:

Lump	$3 00
Steamer	3 00
Grate	3 00
Egg	3 10
Stove	3 60
Chestnut	3 35

It will be observed that the price at which Pittston stove coal is offered is under the lowest rate at which Scranton coal sold at auction.

The production last week shows a slight falling off as compared with the previous week, although about the same as during the corresponding week of 1875. Stocks continue to accumulate.

The following circular explains itself, and shows the consummation of the arrangement which we noted a week ago as being under consideration:

PHILADELPHIA AND READING RAILROAD CO.
General Office, 227 South Fourth Street.
PHILADELPHIA, Dec. 18, 1876.

FROM and after this date, and until further notice, shipments of anthracite coal can be made through by rail to South Amboy, via Richmond Junction, at the following rates, per ton of 2,240 pounds, in company's cars:

From Schuylkill Haven	$1 52
" Tamaqua	1 67
" Pine Grove	1 72
" Port Richmond	65

An additional charge of twenty-five cents per ton will be made on chestnut and pea coal, unless the shipper signs the usual release.

The release now in force will apply to this trade.

(By order of the Board of Managers),

DAVID DROWN, Secretary.

Bituminous.

The Clearfield operaters report a very fair demand, while our last report (for week ending Dec. 7,) shows a production of 30,156 tons—within 150 tons of being the largest week of the year. This is an increase of about 7000 tons over the corresponding week of last year, and must be noticed with alarm by both the Cumberland and anthracite interests. The prime object in the reduction of wages which we noted a week ago as being agitated in the Cumberland region, under the lead of the Consolidation Coal Company, is supposed to be to enable the shippers of coal to place their product at tide-water at a lower cost. The reduction now talked of is 20c. per ton on mining, and other labor in proportion; but, as the Baltimore and Ohio Railroad, which is now so closely identified with the leader of the movement to reduce wages, has advanced its freights so much as to absorb all the advantage that is to be taken from the miner, the movement does not meet with the enthusiastic acception it was anticipated it would.

New York and Philadelphia.

Wholesale Prices of Anthracite Coal f.o.b. at the Tide Water Shipping Ports per ton of 2240 lb.

We refer to our issue of last week for these prices.

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.

We refer to our issue of last week for these prices.

Baltimore, Md. Dec. 20, 1876.

Specially Reported by Messrs. E. STABLER & Co.

ANTHRACITE.

Wholesale or Trade Prices per 2240 lb.

Wilkes-Barre "Boston" Vein, and Plymouth White Ash.

In cars at depot.		In cars at depot.	
Lump	$3 85	Egg	$4 10
Steamboat	4 10	Stove	4 60
Broken	4 10	Nut	4 10

Shamokin, red or white ash.

Egg	4 30	Stove	4 60

Lykens Valley, red ash,

Egg and stove	5 35

From wharf or yard, wholesale, 50@75c. additional.

By retail, all kinds and sizes, per 2240 lb ..... $0 00@7 50

BITUMINOUS.

George's Creek, Cumberland f. o. b. at Locust Point	3 75@4 00
West Virginia Gas f. o. b. at Locust Point	4 50
Youghiogheny Gas, f. o. b. at Locust Point	4 50
Swanton	4 00

Boston, Mass. Dec. 16, 1876.

COAL was in slightly better demand at retail the early part of the week, but the wholesale price continues dull and depressed. Some of the dealers who bought at the auction sales are underselling the regular market.—*Commercial Bulletin.*

Buffalo, N. Y. Dec. 20, 1876.

Specially Reported by Messrs. LEE & LOOMIS.

The increased demand in oil regions owing to activity in the wells—has caused an advance in prices of Catfish coals.

	Lump.	Run of Mine.	Nut.	Slack.
Connellsville Coke	$5 00	....	....	....
Brookfield Coal	4 15	....	....	....
Briar Hill	4 15	....	2 85	....
Youghiogheny	4 25	....	....	....
Monterey	3 55	3 35	....	....
Catfish	3 55	3 35	....	....
Stoneboro	....	....	2 75	2 40
Sterling Cannel	5 00	....	....	....
Reynoldsville	3 50	....	....	2 65
Cameron	3 15	....	....	2 40
Buffalo Coal Co	3 15	....	....	2 40

Chicago, Ill. Dec. 18, 1876.

Specially reported by Messrs. RENO & LITTLE.

Lackawanna Stove	$8 00	Erie and Brier Hill	$6 00
" Chestnut	7 75	Wilmington & Ill.	3 50@4 25
" Grate & Egg,	7 50	Blossburgh	7 00

Cincinnati, O. Dec. 18, 1876.

Specially Reported by Messrs. A. BUCHANAN & Co.

Per ton of 2000 lb.	Bush.	Ton.
Youghiogheny, or Pittsburgh, afloat	@7c.	—
Pomeroy coal	@5c.	—
Kanawha "	7½c.	—
Ohio River Coal	5½c.	—
Cannel coal, according to quality	@16c.	—

The following are the retail prices delivered

Youghiogheny	1c@11c.	—
Pomeroy	9c.	—
Cannel	@22c.	—
Kanawha	10c.	—
Anthracite, per ton	$9 00@9 50	
Coke, at yard	10c.	—
Coke, hard and soft, delivered	— @9c.	—

Cleveland, O. Dec. 18, 1876.

Specially reported by Messrs. LAMBIE & BATES.

The following are the prices established by the Coal Exchange until further notice:

Per ton of 2000 lb. f. o. b. vessels.

WHOLESALE.

	1 to 10 tons.	10 tons upw'd.
Brier Hill lump	$4 25	$4 00
" " nut	3 75	3 50
Massillon and Mineral Ridge lump	4 00	3 75
" " " " nut	3 75	3 50
Straitsville Lower Vein, Hocking & Shawnee, l'p.	3 60	3 35
" " " " nut	3 40	3 15
Del Carbo lump	3 75	3 50
" " nut	3 50	3 25
Rich Hill lump	3 50	3 35
" " nut	3 25	3 00
Columbiana, lump	3 25	3 00
" nut	2 75	2 50
Lacka'a., Wilkesbarre and Pittston egg and grate,	7 00	6 75
" " " stove	7 50	7 25
" " " chestnut	7 25	7 00

Lehigh to be $1 25 per ton higher.

All sales to be strictly cash with order or C. O. D.

Indianapolis, Ind. Dec. 18, 1876.

Specially reported by Messrs. COBB & BRANHAM.

Wholesale on board cars, and retail delivered to consumers.

Per ton of 2000 lb., bushel of 70 lb.

BITUMINOUS.

White River, per ton	$2 50	Peytona cannel, per ton.	5 75
Brazil Block, "	2 50	Indiana Cannel	4 50
Highland, grate, "	2 25	Hocking Valley	4 25
Block coal, nut, per car	18 00	Youghiogheny	4 50
Highland " "	18 00	Blossburg (smithing)	6 50
Block Slack "	17 00	Piedmont "	6 50
		Gas coke, per bushel	10

ANTHRACITE (Lackawanna and Wilkes-Barre.)

Broken	$8 35	Nut	8 50
Egg	8 35	Stove	8 75

Lehigh Anthracite.

Broken	9 75	Nut	9 50
Egg	9 75	Stove	10 00

Retail, per bushel, delivered.

Sand Creek	15c.	Block Nut, steam	8
White River	13	" Slack, "	7
Brazil Block	14	Peytons Cannel	28
Highland grate	13	Virginia "	27
Block Nut, domestic use	12	Youghiogheny	20
Highland Nut, " "	12	Blossburg	26
" " steam	8	Piedmont	26

GAS COKE (measured.)

Crushed	15c.	Lump	12c.

ANTHRACITE,

Wilkes-Barre and Lackawanna (all sizes) ..... $9 75 per ton.
Lehigh, retail ..... $11 50 per ton.

Louisville, Ky. Dec. 18, 1876.

Specially reported by Messrs. BYRNE & SPEED.

WHOLESALE.

	per bushel		per bushel
Pittsburg	6½c.	Pine Hill	—
Raymond City	6½c.	Kentucky	7c.

RETAIL.

	per bushel		per bushel
Pittsburgh	10c.	Peytona Cannel	18c.
Raymond City	10c.	Buckeye "	
Pine Hill	13c.	City-made Coke	8c.
Kentucky	9c.	Anth., per ton, $10 00 to 10 50	

Screened Pittsburgh per load $3 50
Screened Raymond City 2 50
Pine Hill (Kentucky) 2 25
Cannel 4 50
City-made Coke 4 00

Milwaukee, Wis. Dec. 16, 1876.

Specially reported by Messrs. B. P. ELMORE & Co.

The prices on coal are unchanged from last report. Trade is but moderate.

Retail price per ton of 2000 lb.

Lehigh Lump	$ 8 00	Briar Hill, select	$7 00
Lehigh Prepared	9 00	Blossburgh	7 00
Lackawanna (all sizes)	8 00	Cannel	6 00
Pittston	8 00	Pittsburgh	6 50
Scranton	8 00	Oak Hill	6 00
		Steam coal	4@5 00

New Orleans, La. Dec. 16, 1876.

Specially Reported by Messrs. C. A. MILTENBERGER & Co.

We can report a decided improvement in the prices of coal in this market, owing to the limited stock on hand, and the upper rivers being frozen, thus cutting off the supply until probably spring. We quote:

Pittsburg coal, wholesale, by boat-load, per bbl		35@40c
" steamboats, per bbl		50c.
" to manufacturers, per bbl		65c.
" to families		75c.
" shipments, per hhd		$6 50
Anthracite, wholesale, per ton		7@8 00
" retail, "		11 00
Virginia Cannel, retail, per bbl		1 00
Scotch " "		
Mt. Carbon, wholesale, per bbl		
" " retail, "		
St. Bernard wholesale, per bbl		30c.
" steamboat		40c.
" retail. "		65c.

Philadelphia, Pa. Dec. 21, 1876.

From our Special Correspondent.

THERE is no new feature in the trade here, which continues moderately active at retail on account of cold weather, but very dull at wholesale. Dealers have a good supply on hand. The outlet to New York Bay for Schuylkill coal is a fixed part for the present, and until further notice no one knows yet whether it is a temporary trial or to be permanent. Although a step in the right direction, and which ought to have been taken many years ago to give to the Schuylkill region a fair share of the Sound trade, it is not likely to be availed of to any great extent at this particular time, the rates of transportation being too high for the present price of coal—$1.52 from South Haven to South Amboy. Shipping and selling expenses added as well as lateral tolls and rent, leave at the mine such a low price that only those whose necessities are very pressing to postpone the day of final settlement can *afford* it. This harbor is practically shut on account of the large amount of ice in the river and the gorge at the horseshoe, below the city.

Pittston, Pa. Dec. 19, 1876.

Pennsylvania Coal Company's Coal in yard, ton of 2000 lb.

Retail.

Lump, Egg and Stove	$2 25
Chestnut	2 00
Pea	1 00

Delivered, fifty cents per ton additional.

Richmond, Va. Dec. 18, 1876.

Specially reported by S. H. HAWES, Dealer in Coal.

Per ton of 2240 lb., f.o.b.

Kanawha Cannel	$9 00	New River Bituminous,	$4 40
Coalburgh Splint	5 70	Clover Hill Coal	3 50
Lewiston "	5 70	James River Bitum	3 30
Kanawha Gas coal	4 90	" " Carbonite,	5 00

San Francisco, Cal.

From the *Commercial Herald*, Dec. 14, 1876.

Imports from Jan. 1st to Dec. 1st:

	tons.		tons.
Anthracite	10,950	Vancouver Island	87,149
Australian	124,163	Rocky Mountain	163
Coos Bay	35,090	Seattle	81,609
Cumberland	12,421	Bellingham Bay	19,635
English	97,099	Chili	3 150
Mt. Diablo 10 mos	101,733		

As intimated in our last, cargo sales of Scotch and English Steam have been made at $6 75@7. The trouble with us is to know where to discharge and store the many cargoes now afloat in this harbor. The great consumer of all Bituminous, the Gas Company, seems to be fully stocked, and hence it is that vessels under charter for grain are troubled to know how to get rid of their coal in time to load grain outward. Cumberland and Lehigh appear to be the turn dearer, as the prospect for supplies in the near future is lessened by the advancing rates of freight to the Pacific from all Atlantic ports. The present jobbing price of Lehigh from yard $16; Cumberland in bulk, $17. The arrivals of coal from Seattle, Nanaimo, Wellington, Coos Bay, and Bellingham Bay are liberal; yet they all, with the California Mt. Diablo mines, are seriously affected by the prevailing low prices. As an approximation to the present current cargo rates we submit the following: spot price of Cumberland ex-ship, $15@$16 in bulk, $17 in casks; Lehigh, $14.00@$15; Pitston, $14@$14.50 for egg; Sydney Steam, $7.50; Wallsend, $8@$8.25; West Hartley, $8.50@$9; Mount Diablo, fine, $5.75, coarse $7.75; Coos Bay, $8; Seattle, $9; Bellingham Bay, $8.

St. Louis, Mo. Dec. 18, 1876.

Reported by JAS. J. SYLVESTER, Secretary of the Anthracite Coal Association.

Retail prices, delivered. Ton of 2,000 lb.

ANTHRACITE.

	per ton.		per ton.
Lackawanna	$9 00@10 00	Schuylkill	9 00@10 00
Wilkes-Barre	9 00@10 00	Lehigh	10 00@10 50

BITUMINOUS.

Blossburg	9 00	Big Meadow	3 00
Pittsburg	4 50	Illinois Coals	2 50@3 00
Indiana Block	4 00	Connellsville Coke	3 50

Toledo, Ohio. Dec. 18, 1876.

Specially reported by Messrs. GOSLINE & BARBOUR.

We quote as follows for retail delivery:

Ton of 2,000 lb.

Lackawanna lump	$6 75	Lehigh lump	$7 75
" egg	6 75	" egg	7 75
" stove	7 00	" stove	8 00
" chestnut	6 75	" chestnut	7 75

Soft Coal.

Hocking lump	4 00	Brier Hill	5 75
" nut	4 00	Blossburg	8 00
Willow Bank lump	4 50	Cumberland	8 00
" " nut	4 00		

Hamilton, Ont. Dec. 18, 1876.

Specially reported by H. BARNARD, Dealer in Coal.

Retail, per ton of 2,000 lb.

Grate	$5 75	Smithing	6 00
Egg	5 75	Bituminous retail	5 50
Stove	6 00	" steam	4 00
Nut	5 75	Coke	6 75
Lehigh Lump	6 50		

Montreal, Canada. Dec. 18, 1876.

Specially reported by Messrs. ROBERT C. ADAMS & Co.

Wholesale per ton of 2240 lb.

Scotch Steam	$5.25	Cape Breton Steam	$4 50
Pictou "	5 00	Newcastle Smiths	6 50

Anthracite at retail, per 2000 lb., delivered.

Egg	$6 50	Chestnut	6 75
Stove	7 00		

Rates of Transportation on Anthracite Coal to Tide Ports.

We refer to our issue of Dec. 9th for these freights.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, Dec. 22, 1876.

American Pig.—We note a sale of 150 tons of forge at $19 f. o. b. Hoboken, and in addition to this, sundry small lots at our quotations. We are unable to verify any lower prices than $21 for good brands of No. 1 foundry, although there are strong indications that lower prices will soon be named—perhaps upon the opening of the new year. There are at present no indications as to when a revival of business will set in, and, under the present very limited demand, stocks of iron are accumulating. We quote No. 1 foundry at $21; No. 2, $19@$20; and forge, $18.50@$19.

Scotch Pig.—No change is observable in this article. The demand continues only for the most trifling lots. We quote: Coltness $29; Eglinton, $26; and Glengarnock, $28.

Rails.—We note sales, by the Bethlehem mill, of 2,000 tons of iron rails, and 2,500 tons of steel, on private terms. We also note a sale of 1,500 tons of English rails on private terms. We quote iron rails, at mills, at $35@$36; and steel at $48@$54.

Old Rails are still without business, and quoted nominally at $19.50@$20.

Scrap.—We learn of no business in this, and quote No. 1. wrought at $25.50@$26.

Baltimore, Md. Dec. 20, 1876.

Specially reported by Messrs. R. C. HOFFMAN & Co.

The iron market continues in the same depressed condition, with small sales at quotations.

Baltimore Charcoal	$29@32	Anthracite No. 3	$19@20 00
Virginia Charcoal	28@32	Mottled and White	17@18 00
Anthracite No. 1	22@24	Charcoal C. B. Blooms	60@62 50
" No. 2	20@22	Refined Blooms	50@55 00

Boston, Mass. Dec. 16, 1876.

PIG continues extremely depressed. The political situation has some effect. Standard brands of No. 1 iron cannot be quoted now above $22, while gray forge is worth no more than $19. There have been some arrivals of Scotch pig in New York, and the market is easy.

BAR is dull, with the tendency downward, quoting $48 for refined and $39 for common.—*Commercial Bulletin.*

Chattanooga, Tenn. Dec. 18, 1876.

Specially reported by J. F. JAMES. pig iron broker, etc., 233 Market Street.

The market here remains in the same depressed condition as last reported. The few mills and foundries at the present time in operation in the south and southwest are using up their old stocks, and not a single purchase of pig metals has been made for some weeks past, except for the purpose of mixing with inferior pig or scrap on hand.

The decline in prices of Scotch pig at the sea-board has tended to reduce prices a shade lower. Some small sales of Glengarnock and Eglinton are reported as low as $25, spot cash. It is the general opinion in the trade south there will be no improvement until after March next. The present ruling prices are:

Tenn. Ala. and Ga. Charcoal, No. 1 foundry	$20@21
" " " " No. 2 foundry	18@19
" " " " gray forge	16@17
" and Georgia coke, No. 1 foundry	18@19
" " " No. 2 foundry	17@18
" " " gray forge	15@16
White and Mottled	14@15
Tennessee and Georgia cold-blast car wheel	21@25
" " gray forge	16@18
Old Rails	cash 19@20
Cast Scrap	" 10
Wrought Scrap, No. 1	" 18@—
" " " 2	" 12@—

Cincinnati, Ohio. Dec. 19, 1876.

Specially reported by Messrs. TRABER & AUBERY, commission merchants for the sale of pig iron, blooms, ore, etc.

We have no new features to report in our iron market. We quote:

CHARCOAL.

Hanging Rock, No. 1 Foundry	$24 00@25 00—4 mos
" No 2, "	23 00@ —4 mos
" Mill	21 00@ —4 mos
Tennessee, No. 1, Foundry	23 00@ —4 mos
Tennessee, No. 2, "	22 00@ —4 mos
" Mill	21 00@ —4 mos
Missouri, No. 1, Foundry	@ —4 mos

STONE COAL.

Ohio, No. 1, Foundry	22 50@23 00—4 mos
" No. 2, "	21 50@22 50—4 mos
Ohio Mill	20 00@21 00—4 mos
Missouri, No. 1 Foundry	25 00@ —4 mos
" No. 2, "	24 00@ —4 mos
" Mill	23 00@ —4 mos

CAR-WHEEL.

Hanging Rock, C. B	40 00@45 00—4 mos
Tennessee "	25 00@32 00—4 mos
Missouri "	30 00@33 00—4 mos
Alabama "	25 00@32 00—4 mos

BLOOMS.

Charcoal	55 00@ 65 00—cash

SCRAP IRON.

Cast	50c.@ 85—cash
Wrought	1 00@1 40—cash

Cleveland, Ohio. Dec. 18, 1876.

Specially reported by Messrs. C. E. BINGHAM & Co.

Per gross ton, on four months' time. Subject to change in market. Discount for cash 4 per cent.

FOUNDRY IRON.

No. 1, Lake Superior Charcoal	26 50@—
No. 2, " " "	26 00@—
No. 1, Anthracite	24 50@—
No. 2, "	22 50@—
No. 1, Bituminous	24 50@—
No. 2, "	22 50@—
American Scotch, No. 1, Cherry Valley	@—
" " B—1, " "	@—
" " No. 2, " "	@—
No. 1, Massillon	24 50@—
B—1, "	23 00@—
No. 2, "	21 00@—

CAR WHEEL AND MALLEABLE IRON.

No. 3 Lake Superior Charcoal	26 50@—
No. 4 " " "	27 00@—
Nos. 5 and 6 "	27 00@—

BESSEMER IRON.

Nos. 1 and 2 Lake Superior Charcoal	26 50@—

FORGE IRON.

No. 1, Gray	22 00@—
White and Mottled	24 00@—

Louisville, Ky. Dec. 19, 1876.

Specially reported by Messrs. GEORGE H. HULL & Co.

The market is still very dull, but the volume of trade is in excess of last week, and we look for a steady improvement. There has been no change in prices.

Four months allowed on quotations below.

HOT BLAST—CHARCOAL.

No. 1 Foundry, from Hanging Rock Ores	$24 00@25 00
No. 2 " " "	22 00@23 00
No. 1, Mill, from " "	20 00@21 00
No. 1, Foundry, from Alabama, Georgia and Tennessee ores	22 00@23 00
No. 2, Foundry, from Ala., Geor'a and Tenn. ores	21 00@22 00
No. 1, Mill, from " " " "	20 00@21 00

HOT BLAST—STONE COAL AND COKE.

No. 1, Foundry, from Hanging Rock Ores	23 00@25 00
No. 2, " " " "	20 00@21 00
No. 1, Mill, " " " "	20 00@21 00
No. 1, Foundry, from Ala. Ga. and Tenn. Ores.	21 00@22 00
No. 2, " " " "	20 00@21 00
No. 1, Mill, " " " "	20 00@21 00
No. 1 Foundry, from Missouri Ores	— @ —
No. 2 " " "	— @ —
No. 1 Mill, from Missouri Ores	23 00@25 00

COLD BLAST—CHARCOAL.

Car Wheel from Hanging Rock Ores	35 00@43 00
" " Tennessee "	26 00@28 00
" " Alabama and Georgia Ores	28 00@40 00
" " Kentucky Ores	28 00@42 00

Milwaukee, Wis. Dec. 16, 1876.

Specially reported by Messrs. R. P. ELMORE & Co.

The prices on pig iron are unchanged from last report. Trade is quite dull. The brightest part of the iron trade is the anticipation of the future.

Lake Superior No. 1 Charcoal	$16 00
" " " 2 "	25 00
Lake Superior No. 1 Anthracite	25 00
" " " 2 "	24 00

Philadelphia, Pa.

(Weekly report of the Philadelphia Iron Market, furnished by Messrs. JUSTICE, COX, Jr., & Co., Iron Merchants, 333 Walnut Street, Philadelphia. Week ending Dec. 21, 1876.)

PIG IRON.—There is no business of any importance doing. The near approach to the holidays, when most of the mills and founderies shut down for at least a week, make sales few and far between. The market, as for some time, is weak, with a disposition to take lower prices for immediate delivery, while all hope for better things after the New Year comes in. The price of production is being cheapened slightly by a reduction of wages to take effect after the first of the year, but as most founderies are selling at about cost or a little under cost, it is thought this will make no material difference in the selling price. We quote No. 1, $21 to $22; No. 2, $19.50 to $20; forge, $18 to $19 50.

MANUFACTURED IRON.—This branch of the trade is, in sympathy with pig, dull and depressed. It is hoped the advance in freights from the West will give the Eastern mills some advantage, and start some of the now idle mills.

BARS continue to be the dullest article on the list, plate, tank and skelp being more active. We quote: Bars, 2 1-10c. to 2 3-10c. per lb., and skelp 2¼ to 2⅜c. per lb.

RAILS.—There is no special change to report in either steel or iron rails. Some few inquiries with an occasional order for the latter is reported this week. We quote $50 to $52 for steel, $38 to $40 for iron.

OLD RAILS.—In the absence of business we quote $21 to $22.

SCRAP.—We quote: Cast, $14 to $19; wrought, $24 to $27.

Pittsburg, Pa. Dec. 15, 1876.

Specially reported by A. H. CHILDS.

No. 1 Foundry	24 00@25—4	mos
" 2 "	22 00@23	"
Gray Forge	20 00@22	"
White and Mottled	17 50@19	"
Warm blast Charcoal	23 00@28	"
Cold blast Charcoal Western	40 00@45	"

Richmond, Va. Dec. 18, 1876.

Specially reported by ASA SNYDER, Esq.

Regular transactions in charcoal pig iron, on this market, have about closed for the year. There is a speculative inquiry that may absorb the small stock now at the furnaces of Virginia, and shipping points. The production has dwindled down to five furnaces. Twenty-one out of twenty-six—furnaces are out of blast. Quotations are unchanged.

San Francisco, Cal.

From the *Commercial Herald*, Dec. 14, 1876.

There is an order on the market for 1,000 tons pig iron, said to be for the construction of the California Street Hill Railroad—endless chain. This advertisement for bids has called forth considerable movement in the article, resulting in large purchases of Scotch, English, and American iron at all sorts of prices, according to quantity and description, from $30 up to $32.50 per ton. Glengarnock at the close may be quoted at 32.50@35. Sales 900 tons in lots of American and Scotch iron, private. This unlooked for movement in pig iron has occasioned a rise of $2@3 per ton, and the result is a better concentration of stocks than for months past. The ship *Two Brothers* for New York carried 839,913 lb. pig lead. We have no sales tin plate or Sydney tin to record. The imports of bar iron, sheet iron, and other goods in the line have been large for some time past, causing low prices to prevail.

St. Louis, Mo. Dec. 17, 1876.

Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.

Market quiet. Prices firm at quotations. Prospects good for 1877.

CHARCOAL.		STONE COAL.	
Missouri No. 1 Found'y.	$23@25	Missouri No. 1 Fd'ry.	25@24
" " 2 "	22@23	" " 2 "	23@23
" Gray Mill	22@23	" Gray Mill	22@26
H. Rock No. 1 Found'y.	25@26	" White & Mt'd	21@22
" " " 2 "	23½@24		
" " Gray Mill	23@24	COLD BLAST CHARCOAL FOR CAR WHEELS.	
Tenn. No. 1 Foundry	23½@24		
" " 2 "	22½@23	*All Numbers.*	
" Gray Mill	22½@23	Hanging Rock	35@46
COKE.		Tennessee	30@33
Alice H. R. Ex No 1 F'y.	26 00	Kentucky	30@33
" 1 "	25 00	Missouri	28@30
B, " 1 "	24 50	Georgia	28@30
" 2 "	23 50	Alabama	28@30
Forge	23 50	Assorted Bar Iron $2 25, rates.	
Chat., Tenn. No. 1 Fd'y.	25 00	No. 1 Wrought Scrap 95c. cwt.	
" " " 2 "	23 50	Heavy cast " 70 "	
" " Forge	22 50	Light " 40 "	
" " White Mtl'd	21 00		

Montreal, Canada. Dec. 12, 1876.

We quote: Pig Iron. Eglinton and Clyde; $19.50@20.00; Summerlee $20.50@21.00; Langloan & Gartsherrie $22.50@23; Calder $21.50@22.50; Hematite $26.@27. Bar, per 100 lbs., Scotch and Staffordshire $2.@2.05; best do., $2.25@2 35, Swedes and Norway $4.75@$5; Lowmoor and Bowling, $6.@6.50.—*Monetary Times.*

METALS.

NEW YORK, FRIDAY EVENING, Dec. 22, 1876.

THE near approach of the holidays; the end of the year, with the usual closing of books and stock taking, have brought about the lack of business which is always anticipated at this season.

Gold Coin.—During the week under review gold has ranged from 108 to 107¼ and closed at 107⅜.

Bullion.—Last week's large East Indi shipments of silver from London not having been continued this week on the same scale, the sales of India council bills on Wednesday of this week were made at a rate equivalent to a fall of 4½c. an oz. for silver, and the price has fallen to 56 3/16@56 5/16d., at which the market is reported nominal and weak. Unless the demand for the East Indies should increase, the price is likely to decline both abroad and here. The price in this market is $1.21⅛ per oz. Gold is unchanged and quoted at par to ¼ per cent. premium.

Copper.—The sales during the week under review have been very small at 19¾c.@20c., closing at 19⅛c.@19¾c. There is but little copper offering, and still less sought after.

Tin.—Straits in London is quoted at £76, a decline of £2 10/ during the week. There is but very little business doing here. The following are the quotations, in gold: Straits, 17½c.; L. & F., 17¼c.; refined, 17½c.; and Banca, 19c.

Tin Plates.—From 7,000 to 8,000 boxes of tin are reported to have been sold at rates under former quotations, giving a weakening tendency to the whole market. We quote, in gold, per box, as follows: Charcoal tins $6.75, and ternes, $6 25; coke tins, $6, and ternes, $5.62½.

Lead.—About a week ago 400 tons of Richmond lead was sold at 6·07½c. currency. Since then there has been a small business at 6·10c., which is the nominal closing price. Soft Missouri at St. Louis is quoted at 5¾c. currency, with freight to this city at 35c.

Spelter and Zinc.—Domestic spelter is very quiet at 6⅛c currency. Sheet zinc is quoted at 8¼c.@8⅛c. currency for domestic.

Antimony is quiet at 13½c. gold.

Quicksilver.—This article shows no change in this country, although a little weaker abroad. The quotations are: New York, 55c. gold, per lb.; San Francisco, 50c.; and London, £8@£8 10/ per flask.

The San Francisco *Commercial Herald* of Dec. 14 says of quicksilver: The demand for Hongkong by the outgoing steamer *Gaelic* on the 16th inst. is at this writing very light, even at the late decline to 50c. Receipts are liberal and the stock is steadily accumulating."

FINANCIAL.

New York Stocks.

NEW YORK, FRIDAY EVENING, Dec. 22, 1876.

The market for the coal shares closes at a decided advance, about 72,000 shares comprise the transactions for this week, a slight increase over the business reported in our last.

New Jersey Central Railroad—15,405 shares of this stock sold during the week, at from 33½ to 37⅞ closing ⅝ below the higher figure.

It is stated upon good authority that the interest due on the bonds of this company on the 1st of January will be promptly paid.

Mr. E. C. KNIGHT, the President of this Company, has issued the following circular:

NEW YORK December 20, 1876.

To the Stockholders and Bondholders:

The Central Railroad Company of New Jersey have determined to issue certificates of indebtedness to an amount not to exceed $3,000 000, in sums of one hundred, five hundred and one thousand dollars each, payable in ten years, and bearing interest at seven per cent. per annum, payable semi-annually, on the first day of March and September in each year.

The certificates will be secured by depositing with the Guarantee Trust and Safe Deposit Company of Philadelphia consolidated mortgage bonds of the Lehigh and Wilkes-Barre Coal Company, now owned and guaranteed by the Central Railroad Company, in the proportion of five thousand dollars in bonds to every three thousand dollars of certificates issued.

They may be converted at the option of the holders into the said consolidated mortgage bonds at par upon an equitable adjustment of interest, when presented in sums of not less than one thousand dollars.

The company reserve the right to redeem the certificates of indebtedness at any time previous to maturity, by the payment of five per cent. premium and the accured interest to the holders thereof.

The company will receive these certificates of indebtedness in payment of twenty per cent. of any freights due them, not including freight and charges collectable for other parties.

None of the bonds recently issued known as the ten year loan, secured by the "blanket mortgage," have been or will be used except as collateral security for loans. They were not intended for sale or allotment, and will be cancelled as soon as the necessity for their use ceases.

The negotiation of the proposed loan will place the company in an easy financial position, and will, it is believed, greatly enhance the value of the stock and securities.

No sacrifices have been made in raising money, and no higher rate of interest than seven per centum has been paid for its use, except in two instances of a trifling amount, either by this company or by the coal company.

Notwithstanding the nominally large transactions in the securities of the company within the past few months, and the heavy decline in values, the books show that about four-fifths of the capital stock is still held by the same parties who held it a year ago.

Subscribers may arrange to pay in instalments, or the whole amount will be received in one payment.

Subscriptions and payments may be made to the President, EDWARD C. KNIGHT, No. 318 Chestnut Street, Philadelphia, or to the Treasurer, SAMUEL KNOX, at the office of the company, No. 119 Liberty Street, New York, who are authorized to give the proper receipts therefor. By order of the Board of Directors.

E. C. KNIGHT, President.

Delaware, Lackawanna and Western Railroad.—The quotations of this stock have ranged from 69¾ to 73, closing at 72, the transactions for the week aggregating 48,591 shares.

The Morris and Essex Railroad has not paid its taxes in Phillipsburg for the past three years, claiming that they were too high. Their application to the Supreme Court of the State for relief was defeated and they have now taken it to the Supreme Court of the United States.

Delaware and Hudson Canal Company.—This stock has been comparatively quiet, scarcely 3,000 shares having changed hands; the quotations have ranged from 69 to 70¾, at which it closed.

Bonds.—The quotations in these are well maintained. The transactions amount to $166,000.

The American Coal Company will hold its annual meeting on the 28th inst.

New York and Lehigh Coal Company.—We note a recent auction sale of 50 shares of the stock of this company at 83 per cent.

Iron Cliffs Company.—We note a recent auction sale of $20,000 of the 3d and consolidated mortgage 10 per cent. bonds of this company, due in 1884, at 110 per cent.

The Bliven Petroleum Company has declared a dividend of 2½ per cent. payable January 2d.

Emlenton and Shippensville Railroad.—Trains have commenced running on this road to within half a mile of Edinburg, the great oil town of Clarion County. This is the second narrow-gauge road built in the oil region, and it has every promise of being as successful, financially, as its predecessor, the Parker and Karns City road. The new line forms a connecting link between the lower and upper oil fields and the Clarion oil country.

North Chicago Rolling Mill Company.—We note recent quotations of the stock of this company at $30 bid, and $45 asked.

Union Rolling Mill Company, Chicago.—Recent quotations of this stock have ranged at $75 and $90, per share, bid and asked

The Hampshire and Baltimore Coal Company has declared a dividend of 1¼ per cent., payable January 2d.

Quotations and Sales of Stocks and Bonds.

For the week ending Dec. 22, 1876.

STOCKS.

	Highest	Lowest	Closing	Shares sold.
Pennsylvania Coal Co	—	—	250	—
Consolidation Coal Co	—	—	35	—
Spring Mt. Coal Co	—	—	†60	—
American Coal Co	—	—	*54	—
Maryland Coal Co	11	9	11	600
Del., Lack., and West. RR. Co.	72	69¼	72	48,591
New Jersey Central RR. Co.	35⅝	33½	37¼	15,405
Delaware and Hudson Canal Co.	70⅛	69	70¾	2,789
Quicksilver Mining Co. pref'd	20	20	18⅜	100
" " " Common	13	12¼	13	200
Mariposa Land & Min. Co. pref'd	9	7¼	7	4,373
St. Louis & Iron Mountain RR.	15	14½	12	200
Total Shares sold				72,258
Sales for the week previous				68,113
Increase				4,145

*Nominal. † Asked.

BONDS.

	Inter'st	Sales.	Price.
Del., Lack. & West. 2d M	M. & S.	....	.... @108¼
" " " 7's Con'ble	J. & D.	....	.... @106½
Cent'l RR. of N.J., 1st M, New	F. & A.	11,000	108¾@109
" " " 1st Cons.	.....	8,000	80¾@ 83
" " " Convert'le	M. & N.	15,000	79 @ 83
Lehigh & W.-B'e, Con. Guar'd.	.....	69,000	59⅜@ 62
Am. Dock & Imp. Mt. Bonds	J. & J.	....	.... @ 66
Del. & Hud. Can., 1st M., 1891	.....	46,000	104 @104¼
" " " 1884	.....	....	.... @103
" " " 1877	.....	....	.... @101½
" " " Coup. 7's, 1894	.....	[4,000	.... @ 99
" " " Reg'd 7's, 1894	.....	.....	.... @ ....
St. L. & Iron Mountain, 1st M	F. & A.	13,000	101½@101¾
" " " 2d M	M. & N.	.....	.... @ 70
Chesapeake & Ohio 6's, 1st M.	.....	....	.... @ 31
" " " Ex. Coupon	.....	.....	.... @ 20
Mariposa Gold Loan con. 7s	.....	.....	.... @100⅝
Total sales		$166,000	

Closing quotations, in the absence of sales, represent the latest prices bid.

Philadelphia Stocks.

PHILADELPHIA, Thursday Evening, Dec. 21, 1876.

THE total sales in this market for the week just closed have amounted to 176,423 shares, an increase of nearly 43,000 shares. We note quite an improvement in the quotations and a pretty evenly distributed business throughout the list.

Pennsylvania Railroad.—This stock has advanced to 48 with sales of nearly 92,000 shares for the week. It is estimated that the net cash receipts of this company for the year 1876 will exceed the receipts for 1875, by at least one and a quarter million of dollars.

Reading Railroad.—62,321 shares of this stock have changed hands at from 18⅛ to 20½, closing at 20.

The *Ledger* of the 18th inst. says: "This company has consummated an important arrangement with the Pennsylvania Railroad Company, by which the Reading will hold free and open connection with Perth Amboy and

the waters of New York during the season of frost, when navigation here is closed by ice. The Pennsylvan a Railroad Company is to hitch on to the loaded coal cars of the Reading at Richmond Junction, above Philadelphia, and haul them to Amboy, where there is all the year an open harbor for shipments. By this arrangement the Reading Railroad Company furnishes steadily, all the year, a full supply of Schuylkill coal to the New York market. It is estimated that this outlet will afford a market for a thousand or more tons daily during the time that the Delaware may be obstructed by ice, and is just so much sale of coal gained by that company, while the toll charges for the same is just so much gained by the Pennsylvania Railroad Company. There are already extensive facilities at Amboy for coal shipments. The arrangement goes into operation to-day, and through it the stock of some 125,000 tons of coal now on hand at Port Richmond, may be steadily reduced, and the Reading hereafter may be safely relied on by its customers for a steady supply of coal at all seasons."

The United Companies of New Jersey.—On the 20 inst. announced the guaranteed quarterly dividend of *two and a half* per cent. payable in Philadelphia, at the office of the Pennsylvania Railroad Company, on the 10th proximo.

The Philadelphia Wilmington and Baltimore Railroad Company, announces a semi-annual dividend of *four* per cent. payable January 2.

North Pennsylvania Railroad Company.—The annual meeting of the Stockholders of this Company will be held the 8th day of January.

Philadelphia and Reading Railroad Company.—The annual meeting of this Company will be held on the 8th of January, for the Election of President, six Managers, Treasurer, and Secretary.

Lehigh Valley Railroad.—This stock has advanced to 49, 48⅞@49¾ representing the extreme prices for the week This company has announced its usual quarterly dividend of *two* per cent., or one dollar per share, payable January 15. It is said that this company and the New Jersey Central are negotiating for a division of passenger business on their Pennsylvania lines, which are parallel and close together. Such an arrangement would admit of a great reduction in train service on both roads.

Lehigh Coal and Navigation Company.—About 21,000 shares of this stock have changed hands at from 28¼ to 30¾, closing at 30⅜.

Quotations and Sales of Stocks and Bonds,

For the week ending Dec. 21, 1876.

STOCKS.

	Highest	Lowest	Closing	Shares
Lehigh Valley RR. Co	49¼	48½	49	1,222
Pennsylvania RR.	47⅝	46⅞	48	91,869
Reading RR.	20½	18⅝	20	62,321
Lehigh Coal and Nav. Co	30¾	28¼	30⅜	20,944
Penn. Canal	—	—	—	—
Buck Mountain Coal Co.	—	—	*25	—
Fulton Coal Co.	—	—	—	—
Locust Mountain Coal Co	—	—	—	—
Westmoreland Coal Co	—	—	*85	—
St. Nicholas Coal Co.	—	—	—	—
Cambria Iron Co.	—	—	14	—
Crane Iron Co.	—	—	*25	—
Emaus Iron Co	—	—	—	—
Pennsylvania Salt Manufact. Co.	—	—	62	67
Total shares sold				176,423
Sales for the week previous				133,718
Increase				42,705

* These quotations are nominal.

BONDS.

	Sales.	Price
H. and B. T. RR. 1st mortgage, 7s	$ —	— @107
" " " 2d " "	—	— @102
" " " 3d " cons	—	— @ 30
Lehigh Valley RR. Con. mtg. 6s	4,000	— @ 98¼
" " " 7s, 1910	20,000	115⅜@115⅝
" " " 6s Reg.	—	— @107⅜
" " " 6s coup	—	— @106
Pennsylvania RR., 1st mtge. 6s	1,000	— @109¼
" " gen. " cou. 1910	—	— @108
" " gen. " 6s, reg.	—	— @108
" " Cons. M. 6s reg.	1,000	— @ 93
Phil. & Reading RR. Con. M. 7s Reg.	12,000	— @ 91½
" " " 6s, 49-80	12,000	102¾@103
" " " 7s 1893	11,000	103⅜@104
" " new convertible 7s	14,800	62⅛@ 64
" " 6s 1880	—	— @103⅛
" " Cons. M. 7s coup	37,600	91½@ 93
" " debenture 6s	—	— @ 60
" " 6s gold coupon	—	— @ 95
Phil. & Reading C. & I. Co. Deb. 7s	—	— @ 69
" " Helfenstein tract	—	— @ 65
Lehigh Coal & Nav. Co., 6s '84	4,520	103⅛@104
" " " RR. 6s, '97	1,800	— @101½
" " " con. 7s	—	— @ 80
" " " 6s gold loan	10,500	97⅛@100
" " " Conv. gold loan	—	— @101¼
Penn. Canal, 6s	—	— @ 73
Penn. and N. Y. Canal, 7s	—	— @109
Ches. and Del. Canal, 6s	—	— @ 85
Susquehanna Canal, 6s	—	— @ 68
Delaware Division Canal, 6s	—	— @—
Susquehanna Coal Co. 6s	—	— @ 78
Buck. Mount Coal Co. 6s	—	— @—
Penn. Gas Coal Co. 6s	—	— @—
Honeybrook Coal Co. 7s	—	— @—
Total amount of sales	$129,620	

Closing quotations, in the absence of sales, represent the latest prices bid.

Copper Stocks.

Specially reported by Messrs. WILSON W. FAY & Co., Bankers and Brokers, Room 7 Traveller Building, 31 State Street, Boston.

BOSTON, THURSDAY EVENING, Dec. 21, 1876.

THE market at this time of the year, when people are settling up their affairs and getting their matters in shape, to start the new year with clean books, is generally dull, but the year will take the prize for superiority in that line. Calumet is strong and likely to rule so too, as any stock would be in the same position and paying live dividends. The directors are also very heavy stockholders, which can't be said of every copper company in this section. Copper Falls has been very dull, not a sale being made the entire week. Duncan has as usual been the card, fluctuating between 4¼ and 5¼. There is no late news from the mine, and it will probably be some time before they receive any, as it is very difficult to get mails from the mine after the close of navigation. International has been unusually dull, only selling between ⅛ and ⅜, and very small sales at that. About 15,000 shares of the Humboldt Mining Company are advertised for sale May 30, 1877, at 12 o'clock M., at the company's office, Devonshire Street, for non-payment of assessment of 15 cents per share, due October 1, 1876. Quincy has advanced two points to 49 sales, and closes firm at 48½ bid, with little stock offering. Pewabic has advanced from 2 to 2¾ bid, with no stock offering under 3¼. In the small coppers there is nothing doing.

Gold and Silver Stocks.

AMERICAN MINING AND STOCK EXCHANGE.

NEW YORK, FRIDAY EVENING, Dec. 22, 1876.

THE New Board has announced through the chairman of the Executive Committee, that on and after the 2d of January, 1877, there will be added to the regular call list railway shares and miscellaneous securities, the rate of commission on which has been fixed at 1-20 of 1 per cent.

California.—Daily yield, 500 tons of ore, keeping the mills all crushing up to their full capacities. The ore breasts and stopes never looked better or yielded a finer character of ore than they do at this time. The south drift on the 1-600 feet level, has been trimmed up, a track laid, and is now in the best condition possible for a rapid advancement. The face is still in rich ore. The west drift, on the 1650-foot level of the C. & C. shaft, has penetrated a distance of 440 feet west from the station, and will have in the vicinity of 100 feet to yet run to strike the ledge. The face of this drift is in very soft ground, requiring the driving of lagging ahead to keep the ground from caving. Sinking the C. & C. shaft is making the best of progress, considering the strong flow of water at the bottom.

Consolidated Virginia.—Daily yield, 350 tons of ore. The ore stopes are looking well and yielding good ore at all points. One great trouble, however, has been experienced for some time past in the very poor quality of the air on the lower levels. This has been entirely caused by the very dry, lifeless atmosphere that this portion of Nevada has been blessed with for the past three months. A large force of men have been employed during the week enlarging the drifts and trying to benefit the circulation of air on the different levels. Clearing out and repairing the main north drift on the 1700-foot level is making steady progress. The west drift on the 1600-foot level of the C. & C. shaft is in a distance of 440 feet, and will have about 100 feet yet to run to reach the ledge. The California and Consolidated Virginia Mining Companies paid to the City Tax Collector of Virginia, on the 11th inst., the amount of their municipal tax on the proceeds of their mines for the quarter ending 8 ptember 30th. The payment of the California mine was $18,552.79, and the Consolidated Virginia, $3,066.61. Both amounts were paid in gold coin; but under protest, the same being done to prevent a forced collection. The companies also notified the Tax Collector that they would shortly institute suits to recover the amounts already paid.

Belcher.—Daily yield, 200 tons of ore. Sinking the main incline below the 1600-foot level is making fair progress; it is now down 140 feet below that point. The main south drift on the 1600 foot level is being steadily pushed ahead, the face in very favorable ledge matter. The west cross-cut from this drift has penetrated to the west wall, and has been stopped. The east cross-cut is still advancing, the face in quartz of a very solid, encouraging description. The drain shaft is being sunk at the rate of 3½ feet per day. the rock in the bottom working very favorably. This shaft is now down 138 feet below the 1700-foot level.

Ophir.—Daily yield, 220 tons of ore, keeping the Nevada and Santiago mill running to the utmost of their crushing capacities. The ore prospect recently struck in the west cross-cut from the bottom of the winze, on the 1650-foot level, continues to show a decided improvement. The face of the north drift, on the 1700-foot level, is in quartz of a very fine and encouraging character. Preparations are being made to start an east crosscut on the Mexican south line. Sinking the main incline, below the 1700-foot level, is being pushed ahead with all possible speed.

Yellow Jacket.—Sinking the new shaft is making the best of progress, the bottom in good sinking ground. It is now down 185 feet. There is a considerable seepage of water beginning to come in at the sides and bottom of the shaft. The north winze on the 1,740-feet level is down 40 feet, the bottom in very favorable ground. It is the intention to shortly start a drift from this winze to prospect the vein of ore cut on the level above. Sinking the south winze below the 1,940-feet level is making excellent progress. The south drift on the 2,040-feet level is also making good progress and will reach and connect with the south winze some time during the coming week. This connection will greatly benefit the circulation of air in that section of the mine, and enable the running of crosscuts and prospecting of the southern portion of the mine, all of which is in virgin ground, entirely unprospected by any of the drifts or crosscuts that have yet been run on the 2,040-feet level.

Julia.—The main south drift on the 1,600-feet level is steadily advancing, in favorable vein matter, toward the point at which it is the intention to connect with the Ward shaft. The face of the southwest branch of this drift, following the line of the ledge in the Julia ground, is in quartz and ore which assays from $8 to $25 per ton, which shows a steady improvement as the face is advanced. The main south drift on the 1,800-feet level shows no important change, the face still being in soft porphyry. The face of the west cross-cut from this drift is sixty feet from the starting point, and is just entering what is supposed to be the east clay wall of the ore vein, although a survey just completed would indicate that the drift would have nearly 100 feet yet to run to reach a point at which it would strike the ledge, allowing the regular dip of forty-five degrees to the vein, as shown by the developments from the 1,000 to the 1,600 feet levels.

Justice.—Daily yield, 300 tons of ore. The ore stopes on the 400, 500, 600 and 700 feet levels are all showing splendidly. The ore is very rich in sulphurets and stephanite of silver, and all of it carries a considerable proportion of gold. The mine was never before in so fine a condition for working, or assumed as prosperous a look as now. The winze, below the 800-feet level, is pushed steadily downward, the bottom still in good ore. The southeast drift, on the 1,000-feet level, is still advancing toward the ledge, the face being in much softer ground than for some time past. The face of the northeast drift, on the same level, is also in very favorable ledge matter. The mills are all kept running up to their full crushing capacities, and the yield of bullion is steadily on the increase. This company employs four hundred men.

Bullion.—The Alpha drift on the 2,000-feet level is steadily advancing along the west wall of the ledge, the face in soft porphyry, intermixed with streaks of quartz. The north drift on the 1,700 feet level is also making good progress. The connection between the main incline and the winze which connects the 1,400 and 1,700 feet levels was completed on the 6th inst., giving a splendid circulation of pure air. The south drift on this level is making good progress, the face still in quartz, mixed with porphyry. The east crosscut on the 1,400-feet level is making steady progress, without change of value.

Crown Point.—Sinking the main incline is going forward at the rate of three feet per day. It is now down thirty-nine feet below the 1,900-feet level. Everything in and about the mine is in the best condition possible for a good winter's work.

Overman.—The south drift on the 1,200-feet level is steadily advancing toward the south line, the face in very favorable ledge matter. Opening the 1,400-feet station is making favorable progress. The new pumping engine is rapidly nearing completion.

Sutro Tunnel.—Hard porphyry continues to be the principal feature encountered in the face of the header at the present time. It blasts well, however, allowing of good regular progress Total length of tunnel this morning 15,296 feet.—*Gold Hill News*, Dec. 13.

Savage.—The pumps are holding the water well in check below the 1,900 feet level, at which point a large water tank is being put in, and another heavy lift pump inserted. As soon as this is finished men will be set to work to clean out and repair the drifts, preparatory to prospecting and developing the levels in the most thorough manner. At the same time the pumps will be kept at work in the most energetic manner to drain the other levels below.

Hale and Norcross.—The pumps are kept steadily running, and are doing good work. The water is gradually draining, and it is confidently expected that the mine will be completely drained in 60 days more.

Silver Hill.—Sinking the main incline is making good progress, the bottom in fair blasting ground. The north drift on the 444-feet level is rapidly nearing the south line of the Justice Mine.

Chollar-Potosi.—Daily yield, 100 tons of ore. Sinking the main incline is making good progress. Sinking the combination shaft is also making excellent headway. Otherwise nothing new.

Imperial Consolidated.—The north winze has reached the 2,135-feet level, at which point a station is being put in preparatory to starting a drift south to connect with the north drift on the same level from the bottom of the south winze. This will give a good circulation of air and enable the crosscutting and development of the ore vein on the 2,135-feet level. Otherwise no important changes to record.

Gould and Curry.—The erection of the new pumping machinery is being pushed with all the energy possible. There is nothing of importance doing on the lower levels on account of the severe heat and bad air.

Gas Stocks.

NEW YORK, FRIDAY EVENING, Dec. 22, 1876.

GAS stocks are extremely dull, no sales being reported, and scarcely any change occurring in the quotations.

The Nassau, Brooklyn, Gas Company has declared a dividend of 3½ per cent., payable January 15th.

The New York City Gas Difficulty.—The Gas Commission will again, on the 28th inst., open proposals for furnishing the city with gas for the first three months of 1877. The following are the proposals of the various companies for lighting the markets, district court houses, the City Hall, and other public buildings

	Candle power.	Price per 1,000 cubic feet.	Price for 1876.
New York Gas-light Co.	16	$2 40	$2 50
Manhattan Gas-light Co.	16	2 40	2 50
Metropolitan Gas-light Co.	16	2 50	2 50
N. Y. Mutual Gas-light Co.	19	2 50	2 50
Harlem Gas-light Co.	16	2 75	2 75

The proposals were laid over.

The Philadelphia Gas Appropriation for 1877.—At a meeting of the Common Council held on the 18th instant, it was resolved to further reduce the appropriation for lighting the street lamps for 1877 to $32 per lamp. There being 11,350 lamps, the total sum required would equal $363,200. This makes a total reduction for

Philadelphia, Pa.

[Weekly report of the Philadelphia Iron Market, furnished by Messrs. JUSTICE, COX, JR., & Co., Iron Merchants, 333 Walnut Street, Philadelphia. Week ending Dec. 21, 1876.]

PIG IRON.—There is no business of any importance doing. The near approach to the holidays, when most of the mills and founderies shut down for at least a week, make sales few and far between. The market, as for some time, is weak, with a disposition to take lower prices for immediate delivery, while all hope for better things after the New Year comes in. The price of production is being cheapened slightly by a reduction of wages to take effect after the first of the year, but as most founderies are selling at about cost or a little under cost, it is thought this will make no material difference in the selling price. We quote No. 1, $21 to $22; No. 2, $19.50 to $20; forge, $18 to $19 50.

MANUFACTURED IRON.—This branch of the trade is, in sympathy with pig, dull and depressed. It is hoped the advance in freights from the West will give the Eastern mills some advantage, and start some of the now idle mills.

BARS continue to be the dullest article on the list, plate, tank and skelp being more active. We quote: Bars, 2 1-10c. to 2 3-10c. per lb., and skelp 2¼ to 2¼c. per lb.

RAILS.—There is no special change to report in either steel or iron rails. Some few inquiries with an occasional order for the latter is reported this week. We quote $50 to $52 for steel, $38 to $40 for iron.

OLD RAILS.—In the absence of business we quote $21 to $22.

SCRAP.—We quote: Cast, $14 to $19; wrought, $24 to $27.

Pittsburg, Pa. Dec. 15, 1876.

Specially reported by A. H. CHILDS.

No. 1 Foundry	24 00@25	4 mos
" 2 "	22 00@23	"
Gray Forge	20 00@22	"
White and Mottled	17 50@19	"
Warm blast Charcoal	23 00@28	"
Cold blast Charcoal Western	40 00@45	"

Richmond, Va. Dec. 18, 1876.

Specially reported by ASA SNYDER, Esq.

Regular transactions in charcoal pig iron, on this market, have about closed for the year. There is a speculative inquiry that may absorb the small stock now at the furnaces of Virginia, and shipping points. The production has dwindled down to five furnaces. Twenty-one out of twenty-six—furnaces are out of blast. Quotations are unchanged.

San Francisco, Cal.

From the *Commercial Herald*, Dec. 14, 1876.

There is an order on the market for 1,000 tons pig iron, said to be for the construction of the California Street Hill Railroad—endless chain. This advertisement for bids has called forth considerable movement in the article, resulting in large purchases of Scotch, English, and American iron at all sorts of prices, according to quantity and description, from $30 up to $32.50 per ton. Glengarnock at the close may be quoted at 32.50@35. Sales 900 tons in lots of American and Scotch iron, private. This unlooked for movement in pig iron has occasioned a rise of $2@3 per ton, and the result is a better concentration of stocks than for months past. The ship *Two Brothers* for New York carried 839,913 lb. pig lead. We have no sales tin plate or Sydney tin to record. The imports of bar iron, sheet iron, and other goods in the line have been large for some time past, causing low prices to prevail.

St. Louis, Mo. Dec. 17, 1876.

Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.

Market quiet. Prices firm at quotations. Prospects good for 1877.

CHARCOAL.	
Missouri No. 1 Found'y.	$23@25
" " 2 "	22@23
" Gray Mill	22@23
H. Rock No. 1 Found'y.	25@26
" " " 2 "	23½@24
" " Gray Mill	23@24
Tenn. No. 1 Foundry	23½@24
" " 2 "	22½@23
" Gray Mill	22½@23
COKE.	
Alice H. R. Ex No 1 F'y.	26 00
" 1 "	25 00
B, " 1 "	24 50
" 2 "	23 50
Forge	23 50
Chat., Tenn. No. 1 Fd'y.	25 00
" " " 2 "	23 50
" " Forge	22 50
" " White Mtl'd	21 00

STONE COAL.	
Missouri No. 1 Fd'ry.	25@24
" " 2 "	23@23
" Gray Mill	22@26
" White & Mt'd	21@22
COLD BLAST CHARCOAL FOR CAR WHEELS.	
All Numbers.	
Hanging Rock	35@46
Tennessee	30@33
Kentucky	30@33
Missouri	28@30
Georgia	28@30
Alabama	28@30
Assorted Bar Iron $2 25, rates.	
No. 1 Wrought Scrap 95c. cwt.	
Heavy cast " 70 "	
Light " 40 "	

Montreal, Canada. Dec. 12, 1876.

We quote: Pig Iron. Eglinton and Clyde; $19.50@20.00; Summerlee $20.50@21 00; Langloan & Gartsherrie $22.50@23; Calder $21.50@22.50; Hematite $26.@27. Bar, per 100 lbs., Scotch and Staffordshire $2.@2.05; best do., $2.25@2 35, Sweles and Norway $4.75@$5; Lowmoor and Bowling, $6.@6.50.—*Monetary Times.*

METALS.

NEW YORK, FRIDAY EVENING, Dec. 22, 1876.

THE near approach of the holidays; the end of the year, with the usual closing of books and stock taking, have brought about the lack of business which is always anticipated at this season.

Gold Coin.—During the week under review gold has ranged from 108 to 107¼ and closed at 107⅜.

Bullion.—Last week's large East Indi shipments of silver from London not having been continued this week on the same scale, the sales of India council bills on Wednesday of this week were made at a rate equivalent to a fall of 4½c. an oz. for silver, and the price has fallen to 56¾@56¼d., at which the market is reported nominal and weak. Unless the demand for the East Indies should increase, the price is likely to decline both abroad and here. The price in this market is $1.21¼ per oz. Gold is unchanged and quoted at par to ¼ per cent. premium.

Copper.—The sales during the week under review have been very small at 19¾c.@20c., closing at 19¼c.@ 19¾c. There is but little copper offering, and still less sought after.

Tin.—Straits in London is quoted at £76, a decline of £2 10/ during the week. There is but very little business doing here. The following are the quotations, in gold: Straits, 17¼c.; L. & F., 17¼c.; refined, 17½c.; and Banca, 19c.

Tin Plates.—From 7.000 to 8,000 boxes of tin are reported to have been sold at rates under former quotations, giving a weakening tendency to the whole market. We quote, in gold, per box, as follows: Charcoal tins $6.75, and ternes, $6 25; coke tins, $6, and ternes $5.62½.

Lead.—About a week ago 400 tons of Richmond lead was sold at 6·07½c. currency. Since then there has been a small business at 6·10c., which is the nominal closing price. Soft Missouri at St. Louis is quoted at 5⅞c. currency, with freight to this city at 35c.

Spelter and Zinc.—Domestic spelter is very quiet at 6¼c currency. Sheet zinc is quoted at 8¼c.@8½c. currency for domestic.

Antimony is quiet at 13½c. gold.

Quicksilver.—This article shows no change in this country, although a little weaker abroad. The quotations are: New York, 55c. gold, per lb.; San Francisco, 50c.; and London, £8@£8 10/ per flask.

The San Francisco *Commercial Herald* of Dec. 14 says of quicksilver: The demand for Hongkong by the outgoing steamer *Gaelic* on the 16th inst. is at this writing very light, even at the late decline to 50c. Receipts are liberal and the stock is steadily accumulating."

FINANCIAL.

New York Stocks.

NEW YORK, FRIDAY EVENING, Dec. 22, 1876.

The market for the coal shares closes at a decided advance, about 72.000 shares comprise the transactions for this week, a slight increase over the business reported in our last.

New Jersey Central Railroad—15,405 shares of this stock sold during the week, at from 33½ to 37⅞ closing ⅝ below the higher figure.

It is stated upon good authority that the interest due on the bonds of this company on the 1st of January will be promptly paid.

Mr. E. C. KNIGHT, the President of this Company, has issued the following circular:

NEW YORK December 20, 1876.

To the Stockholders and Bondholders:

The Central Railroad Company of New Jersey have determined to issue certificates of indebtedness to an amount not to exceed $3,000 000, in sums of one hundred, five hundred and one thousand dollars each, payable in ten years, and bearing interest at seven per cent. per annum, payable semi-annually, on the first day of March and September in each year.

The certificates will be secured by depositing with the Guarantee Trust and Safe Deposit Company of Philadelphia consolidated mortgage bonds of the Lehigh and Wilkes-Barre Coal Company, now owned and guaranteed by the Central Railroad Company, in the proportion of five thousand dollars in bonds to every three thousand dollars of certificates issued.

They may be converted at the option of the holders into the said consolidated mortgage bonds at par upon an equitable adjustment of interest, when presented in sums of not less than one thousand dollars.

The company reserve the right to redeem the certificates of indebtedness at any time previous to maturity, by the payment of five per cent. premium and the accured interest to the holders thereof.

The company will receive these certificates of indebtedness in payment of twenty per cent. of any freights due them, not including freight and charges collectable for other parties.

None of the bonds recently issued known as the ten year loan, secured by the "blanket mortgage," have been or will be used except as collateral security for loans. They were not intended for sale or allotment, and will be cancelled as soon as the necessity for their use ceases.

The negotiation of the proposed loan will place the company in an easy financial position, and will, it is believed, greatly enhance the value of the stock and securities.

No sacrifices have been made in raising money, and no higher rate of interest than seven per centum has been paid for its use, except in two instances of a trifling amount, either by this company or by the coal company.

Notwithstanding the nominally large transactions in the securities of the company within the past few months, and the heavy decline in values, the books show that about four-fifths of the capital stock is still held by the same parties who held it a year ago.

Subscribers may arrange to pay in instalments, or the whole amount will be received in one payment.

Subscriptions and payments may be made to the President, EDWARD C. KNIGHT, No. 318 Chestnut Street, Philadelphia, or to the Treasurer, SAMUEL KNOX, at the office of the company, No. 119 Liberty Street, New York, who are authorized to give the proper receipts therefor. By order of the Board of Directors.

E. C. KNIGHT, President.

Delaware, Lackawanna and Western Railroad.—The quotations of this stock have ranged from 69¾ to 73, closing at 72, the transactions for the week aggregating 48 591 shares.

The Morris and Essex Railroad has not paid its taxes in Phillipsburg for the past three years, claiming that they were too high. Their application to the Supreme Court of the State for relief was defeated and they have now taken it to the Supreme Court of the United States.

Delaware and Hudson Canal Company.—This stock has been comparatively quiet, scarcely 3,000 shares having changed hands; the quotations have ranged from 69 to 70¾, at which it closed.

Bonds.—The quotations in these are well maintained. The transactions amount to $166,000.

The American Coal Company will hold its annual meeting on the 28th inst.

New York and Lehigh Coal Company.—We note a recent auction sale of 50 shares of the stock of this company at 83 per cent.

Iron Cliffs Company.—We note a recent auction sale of $20.000 of the 3d and consolidated mortgage 10 per cent. bonds of this company, due in 1884, at 110 per cent.

The Bliven Petroleum Company has declared a dividend of 2½ per cent. payable January 2d.

Emlenton and Shippensville Railroad.—Trains have commenced running on this road to within half a mile of Edinburg, the great oil town of Clarion County. This is the second narrow-gauge road built in the oil region, and it has every promise of being as successful, financially, as its predecessor, the Parker and Karns City road. The new line forms a connecting link between the lower and upper oil fields and the Clarion oil country.

North Chicago Rolling Mill Company.—We note recent quotations of the stock of this company at $30 bid, and $45 asked.

Union Rolling Mill Company, Chicago.—Recent quotations of this stock have ranged at $75 and $90, per share, bid and asked

The Hampshire and Baltimore Coal Company has declared a dividend of 1½ per cent., payable January 2d.

Quotations and Sales of Stocks and Bonds.

For the week ending Dec. 22, 1876.

STOCKS.

	Highest	Lowest	Closing	Shares sold.
Pennsylvania Coal Co	—	—	250	—
Consolidation Coal Co	—	—	35	—
Spring Mt. Coal Co	—	—	100	—
American Coal Co	—	—	*54	—
Maryland Coal Co	11	9	11	60
Del., Lack., and West. RR. Co.	72	69¼	72	48,591
New Jersey Central RR. Co.	35⅝	33½	37¼	15,405
Delaware and Hudson Canal Co.	70½	69	70¾	2,789
Quicksilver Mining Co. pref'd	20	20	18⅝	100
" " " Common	13	12¼	13	200
Mariposa Land & Min. Co. pref'd	9	7¼	7	4.373
St. Louis & Iron Mountain RR.	15	14½	12	200
Total Shares sold				72,258
Sales for the week previous				68,113
Increase				4,145

*Nominal. † Asked.

BONDS.

		Inter'st	Sales.	Price.
Del., Lack. & West. 2d M		M. & S.	....	.... @108¼
" " "	7's Con'ble	J. & D.	....	.... @106½
Cent'l RR. of N.J., 1st M, New		F. & A.	11,000	108¾@109
" " "	1st Cons.	.....	8,000	80½@ 83
" " "	Convert'le	M. & N.	15,000	79 @ 83
Lehigh & W.-B'e, Con. Guar'd.		.....	69,000	59⅝@ 62
Am. Dock & Imp. Mt. Bonds		J. & J.	....	.... @ 66
Del. & Hud. Can., 1st M., 1891		.....	46,000	104 @104¼
" " "	1884	.....	....	.... @103
" " "	1877	.....	....	.... @101½
" " "	Coup. 7's, 1894	.....	[4,000	.... @ 99
" " "	Reg'd 7's, 1894	.....	.....	.... @ ...
St. L. & Iron Mountain, 1st M		F. & A.	13,000	101½@101⅞
" " "	2d M	M. & N.	.....	.... @ 70
Chesapeake & Ohio 6's, 1st M.		.....	....	.... @ 31
" "	Ex. Coupon	.....	.....	.... @ 20
Mariposa Gold Loan con. 7s		.....	.....	.... @100⅝
Total sales			$166,000	

Closing quotations, in the absence of sales, represent the latest prices bid.

Philadelphia Stocks.

PHILADELPHIA, Thursday Evening, Dec. 21, 1876.

THE total sales in this market for the week just closed have amounted to 176,423 shares, an increase of nearly 43,000 shares. We note quite an improvement in the quotations and a pretty evenly distributed business throughout the list.

Pennsylvania Railroad.—This stock has advanced to 48 with sales of nearly 92,000 shares for the week. It is estimated that the net cash receipts of this company for the year 1876 will exceed the receipts for 1875, by at least one and a quarter million of dollars.

Reading Railroad.—62,321 shares of this stock have changed hands at from 18½ to 20½, closing at 20.

The *Ledger* of the 18th inst. says: "This company has consummated an important arrangement with the Pennsylvania Railroad Company, by which the Reading will hold free and open connection with Perth Amboy and

the waters of New York during the season of frost, when navigation here is closed by ice. The Pennsylvan a Railroad Company is to hitch on to the loaded coal cars of the Reading at Richmond Junction, above Philadelphia, and haul them to Amboy, where there is all the year an open harbor for shipments. By this arrangement the Reading Railroad Company furnishes steadily, all the year, a full supply of Schuylkill coal to the New York market. It is estimated that this outlet will afford a market for a thousand or more tons daily during the time that the Delaware may be obstructed by ice, and is just so much sale of coal gained by that company, while the toll charges for the same is just so much gained by the Pennsylvania Railroad Company. There are already extensive facilities at Amboy for coal shipments. The arrangement goes into operation to-day, and through it the stock of some 125,000 tons of c al now on hand at Port Richmond, may be steadily reduced, and the Reading hereafter may be safely relied on by its customers for a steady supply of coal at r ll seasons."

The United Companies of New Jersey.—On the 20 inst. announced the guaranteed quarterly dividend of *two and a half* per cent. payable in Philadelphia, at the office of the Pennsylvania Railroad Company, on the 10th proximo.

The Philadelphia Wilmington and Baltimore Railroad Company, announces a semi-annual dividend of *four* per cent. payable January 2.

North Pennsylvania Railroad Company.—The annual meeting of the Stockholders of this Company will be held the 8th day of January.

Philadelphia and Reading Railroad Company.—The annual meeting of this Company will be held on the 8th of January, for the Election of President, six Managers, Treasurer, and Secretary.

Lehigh Valley Railroad.—This stock has advanced to 49, 48½@49¾ representing the extreme prices for the week. This company has announ ed its usual quarterly dividend of *two* per cent., or one dollar per share, payable January 15. It is said that this company and the New Jersey Central are negotiating for a division of passenger business on their Pennsylvania lines, which are parallel and close together. Such an arrangement would admit of a great reduction in train service on both roads.

Lehigh Coal and Navigation Company.—About 21,000 shares of this stock have changed h ands at from 28¼ to 30¾, closing at 30⅜.

Quotations and Sales of Stocks and Bonds,

For the week ending Dec. 21, 1876.

STOCKS.

	Highest	Lowest	Closing	Shr s
Lehigh Valley RR. Co	49¾	48½	49	1,222
Pennsylvania RR.	47⅞	46⅞	48	91,869
Reading RR.	20½	18⅝	20	62,321
Lehigh Coal and Nav. Co	30¾	28¼	30⅜	20,944
Penn. Canal	—	—	—	—
Buck Mountain Coal Co.	—	—	*25	—
Fulton Coal Co.	—	—	—	—
Locust Mountain Coal Co	—	—	—	—
Westmoreland Coal Co	—	—	*85	—
St. Nicholas Coal Co.	—	—	—	—
Cambria Iron Co	—	—	14	—
Crane Iron Co.	—	—	*25	—
Emaus Iron Co	—	—	—	—
Pennsylvania Salt Manufact. Co.	—	—	62	67
Total shares sold				176,423
Sales for the week previous				133,718
Increase				42,705

* These quotations are nominal.

BONDS.

	Sales.	Price
H. and B. T. RR. 1st mortgage, 7s	$ —	— @107
" " " 2d " "	—	— @102
" " " 3d " cons	—	— @ 39
Lehigh Valley RR. Con. mtg. 6s	4,000	— @ 98¼
" " " 7s, 1910	20,000	115¾@115⅞
" " " 6s Reg.	—	— @107⅜
" " " 6s coup	—	— @106
Pennsylvania RR., 1st mtge. 6s	1,000	— @109¼
" " gen. " cou. 1910	—	— @108
" " gen. " 6s, reg.	—	— @108
" " Cons. M. 6s reg.	1,000	— @ 93
Phil. & Reading RR. Con. M. 7s Reg.	12,200	— @ 91½
" " " 6s, 49-80	12,000	102¾@103
" " " 7s 1893	11,000	103¾@104
" " new convertible 7s	14,800	62½@ 64
" " 6s 1880	—	— @103½
" " Cons. M. 7s coup	37,600	91½@ 93
" " debenture 6s	—	— @ 60
" " 6s gold coupon	—	— @ 95
Phil. & Reading C. & I. Co. Deb. 7s	—	— @ 69
" " Helfenstein tract	—	— @ 65
Lehigh Coal & Nav. Co., 6s '84	4,520	103½@104
" " " RR. 6s, '97	1,800	— @101½
" " " con. 7s	—	— @ 80
" " " 6s gold loan	10,500	97½@100
" " " Conv. gold loan	—	— @101¼
Penn. Canal, 6s	—	— @ 73
Penn. and N. Y. Canal, 7s	—	— @109
Ches. and Del. Canal, 6s	—	— @ 85
Susquehanna Canal, 6s	—	— @ 68
Delaware Division Canal, 6s	—	— @—
Susquehanna Coal Co. 6s	—	— @ 78
Buck. Mount Coal Co. 6s	—	— @—
Penn. Gas Coal Co. 6s	—	— @—
Honeybrook Coal Co. 7s	—	— @—
Total amount of sales	$129,620	

Closing quotations, in the absence of sales, represent the latest prices bid.

Copper Stocks.

Specially reported by Messrs. WILSON W. FAY & Co., Bankers and Brokers, Room 7 Traveller Building, 31 State Street, Boston.

BOSTON, THURSDAY EVENING, Dec. 21, 1876.

THE market at this time of the year, when people are settling up their affairs and getting their matters in shape, to start the new year with clean books, is generally dull, but the year will take the prize for superiority in that line. Calumet is strong and likely to rule so too, as any stock would be in the same position and paying live dividends. The directors are also very heavy stockholders, which can't be said of every copper company in this section. Copper Falls has been very dull, not a sale being made the entire week. Duncan has as usual been the card, fluctuating between 4¼ and 5¼. There is no late news from the mine, and it will probably be some time before they receive any, as it is very difficult to get mails from the mine after the close of navigation. International has been unusually dull, only selling between ½ and ⅝, and very small sales at that. About 15,000 shares of the Humboldt Mining Company are advertised for sale May 30, 1877, at 12 o'clock M., at the company's office, Devonshire Street, for non-payment of assessment of 15 cents per share, due October 1, 1876. Quincy has advanced two points to 49 sales, and closes firm at 48½ bid, with little stock offering. Pewabic has advanced from 2 to 2¾ bid, with no stock offering under 3¼. In the small coppers there is nothing doing.

Gold and Silver Stocks.

AMERICAN MINING AND STOCK EXCHANGE.

NEW YORK, FRIDAY EVENING, Dec. 22, 1876.

THE New Board has announced through the chairman of the Executive Committee, that on and after the 2d of January, 1877, there will be added to the regular call list railway shares and miscellaneous securities, the rate of commission on which has been fixed at 1-20 of 1 per cent.

California.—Daily yield, 500 tons of ore, keeping the mills all crushing up to their full capacities. The ore breasts and stopes never looked better or yielded a finer character of ore than they do at this time. The south drift on the 1-600 feet level, has been trimmed up, a track laid, and is now in the best condition possible for a rapid advancement. The face is still in rich ore. The west drift, on the 1650-foot level of the C. & C. shaft, has penetrated a distance of 440 feet west from the station, and will have in the vicinity of 100 feet to yet run to strike the ledge. The face of this drift is in very soft ground, requiring the driving of lagging ahead to keep the ground from caving. Sinking the C. & C. shaft is making the best of progress, considering the strong flow of water at the bottom.

Consolidated Virginia.—Daily yield, 350 tons of ore. The ore stopes are looking well and yielding good ore at all points. One great trouble, however, has been experienced for some time past in the very poor quality of the air on the lower levels. This has been entirely caused by the very dry, lifeless atmosphere that this portion of Nevada has been blessed with for the past three months. A large force of men have been employed during the week enlarging the drifts and trying to benefit the circulation of air on the different levels. Clearing out and repairing the main north drift on the 1700-foot level is making steady progress. The west drift on the 1600-foot level of the C. & C. shaft is in a distance of 440 feet, and will have about 100 feet yet to run to reach the ledge. The California and Consolidated Virginia Mining Companies paid to the City Tax Collector of Virginia, on the 11th inst., the amount of their municipal tax on the proceeds of their mines for the quarter ending 8 ptember 30th. The payment of the California mine was $18,-552.79, and the Consolidated Virginia, $3,066.61. Both amounts were paid in gold coin; but under protest, the same being done to prevent a forced collection. The companies also notified the Tax Collector th t they would shortly institute suits to recover the amounts already paid.

Belcher.—Daily yield, 200 tons of ore. Sinking the main incline below the 1600-foot level is making fair progress; it is now down 140 feet below that point. The main south drift on the 1600 foot level is being steadily pushed ahead, the face in very favorable ledge matter. The west cross-cut from this drift has penetrated to the west wall, and has been stopped. The east cross-cut is still advancing, the face in quartz of a very solid, encouraging description. The drain shaft is being sunk at the rate of 3½ feet per day, the rock in the bottom working very favorably. This shaft is now down 138 feet below the 1700-foot level.

Ophir.—Daily yield, 220 tons of ore, keeping the Nevada and Santiago mill running to the utmost of their crushing capacities. The ore prospect recently struck in the west cross-cut from the bottom of the winze, on the 1650-foot level, continues to show a decided improvement. The face of the north drift, on the 1700-foot level, is in quartz of a very fine and encouraging character. Preparations are being made to start an east cross-cut on the Mexican south line. Sinking the main incline, below the 1700-foot level, is being pushed ahead with all possible speed.

Yellow Jacket.—Sinking the new shaft is making the best of progress, the bottom in good sinking ground. It is now down 185 feet. There is a considerable seepage of water beginning to come in at the sides and bottom of the shaft. The north winze on the 1,740-feet level is down 40 feet, the bottom in very favorable ground. It is the intention to shortly start a drift from this winze to prospect the vein of ore cut on the level above. Sinking the south winze below the 1,940-feet level is making excellent progress. The south drift on the 2,040-feet level is also making good progress and will reach and connect with the south winze some time during the coming week. This connection will greatly benefit the circulation of air in that section of the mine, and enable the running of crosscuts and prospecting of the southern portion of the mine, all of which is in virgin ground, entirely unprospected by any of the drifts or crosscuts that have yet been run on the 2,040-feet level.

Julia.—The main south drift on the 1,600-feet level is steadily advancing, in favorable vein matter, toward the point at which it is the intention to connect with the Ward shaft. The face of the southwest branch of this drift, following the line of the ledge in the Julia ground, is in quartz and ore which assays from $8 to $25 per ton, which shows a steady improvement as the face is advanced. The main south drift on the 1,800-feet level shows no important change, the face still being in soft porphyry. The face of the west cross-cut from this drift is sixty feet from the starting point, and is just entering what is supposed to be the east clay wall of the ore vein, although a survey just completed would indicate that the drift would have nearly 100 feet yet to run to reach a point at which it would strike the ledge, allowing the regular dip of forty-five degrees to the vein, as shown by the developments from the 1,000 to the 1,600 feet levels.

Justice.—Daily yield, 300 tons of ore. The ore stopes on the 400, 500, 600 and 700 feet levels are all showing splendidly. The ore is very rich in sulphurets and stephanite of silver, and all of it carries a considerable proportion of gold. The mine was never before in so fine a condition for working, or assumed as prosperous a look as now. The winze, below the 800-feet level, is pushed steadily downward, the bottom still in good ore. The southeast drift, on the 1,000-feet level, is still advancing toward the ledge, the face being in much softer ground than for some time past. The face of the northeast drift, on the same level, is also in very favorable ledge matter. The mills are all kept running up to their full crushing capacities, and the yield of bullion is steadily on the increase. This company employs four hundred men.

Bullion.—The Alpha drift on the 2,000-feet level is steadily advancing along the west wall of the ledge, the face in soft porphyry, intermixed with streaks of quartz. The north drift on the 1,700 feet level is also making good progress. The connection between the main incline and the winze which connects the 1,400 and 1,700 feet levels was completed on the 6th inst., giving a splendid circulation of pure air. The south drift on this level is making good progress, the face still in quartz, mixed with porphyry. The east crosscut on the 1,400-feet level is making steady progress, without change of value.

Crown Point.—Sinking the main incline is going forward at the rate of three feet per day. It is now down thirty-nine feet below the 1,900-feet level. Everything in and about the mine is in the best condition possible for a good winter's work.

Overman.—The south drift on the 1,200-feet level is steadily advancing toward the south line, the face in very favorable ledge matter. Opening the 1,400-feet station is making favorable progress. The new pumping engine is rapidly nearing completion.

Sutro Tunnel.—Hard porphyry continues to be the principal feature encountered in the face of the header at the present time. It blasts well, however, allowing of good regular pro ress. Total length of tunnel this morning 15,296 feet.—*Gold Hill News*, Dec. 13.

Savage.—The pumps are holding the water well in check below the 1,900 feet level, at which point a large water tank is being put in, and another heavy lift pump inserted. As soon as this is finished men will be set to work to clean out and repair the drifts, preparatory to prospecting and developing the levels in the most thorough manner. At the same time the pumps will be kept at work in the most energetic manner to drain the other levels below.

Hale and Norcross.—The pumps are kept steadily running, and are doing good work. The water is gradually draining, and it is confidently expected that the mine will be completely drained in 60 days more.

Silver Hill.—Sinking the main incline is making good progress, the bottom in fair blasting ground. The north drift on the 444-feet level is rapidly nearing the south line of the Justice Mine.

Chollar-Potosi.—Daily yield, 100 tons of ore. Sinking the main incline is making good progress. Sinking the combination shaft is also making excellent headway. Otherwise nothing new.

Imperial Consolidated.—The north winze has reached the 2,135-feet level, at which point a station is being put in preparatory to starting a drift south to connect with the north drift on the same level from the bottom of the south winze. This will give a good circulation of air and enable the crosscutting and development of the ore vein on the 2,135-feet level. Otherwise no important changes to record.

Gould and Curry.—The erection of the new pumping machinery is being pushed with all the energy possible. There is nothing of importance doing on the lower levels on account of the severe heat and bad air.

Gas Stocks.

NEW YORK, FRIDAY EVENING, Dec. 22, 1876.

GAS stocks are extremely dull, no sales being reported, and scarcely any change occurring in the quotations.

The Nassau, Brooklyn, Gas Company has declared a dividend of 3½ per cent., payable January 15th.

The New York City Gas Difficulty.—The Gas Commission will again, on the 28th inst., open proposals for furnishing the city with gas for the first three months of 1877. The following are the proposals of the various companies for lighting the markets, district court houses, the City Hall, and other public buildings

	Candle power.	Price per 1,000 cubic feet.	Price for 1876.
New York Gas-light Co.	16	$2 40	$2 50
Manhattan Gas-light Co.	16	2 40	2 50
Metropolitan Gas-light Co.	16	2 50	2 50
N. Y. Mutual Gas-light Co.	19	2 50	2 50
Harlem Gas-light Co.	16	2 75	2 75

The proposals were laid over.

The Philadelphia Gas Appropriation for 1877.—At a meeting of the Common Council held on the 18th instant, it was resolved to further reduce the appropriation for lighting the street lamps for 1877 to $32 per lamp. There being 11,350 lamps, the total sum required would equal $363,200. This makes a total reduction for

MINING STOCKS.

AMERICAN MINING AND STOCK EXCHANGE.

Name of Company.	Location.	Feet on Vein.	Capital Stock.	*a* No. of Shares.	Total Assessments Levied.	Date and Amount of Last Assessment per share.	Total Dividends paid.	Date and Amount of Last Dividend per share.	Closing Quotations.*g* American Currency. Sat.	Mon.	Tues.	Wed.	Thurs.	Fri.	Shares sold during the Week.
Alpha Cons. G. S.	Nevada,	300	$ 3,000,000	30,000	$180,000	Aug. 12, '75, $1.	....	.....	$37 25	$37 25	$34 25	$34 50	$35 00	$33 25	1,550
Belcher, G. S.	Nevada,	1,040	10,400,000	104,000	660,400	April 14, '71, $1.	$15,397,200	April 10, '76, $1.	14 75	14 50	14 25	14 00	13 12½	11 25	1,900
Bertha Gold Co.	Virgi'a.	645 acs.	300,000	30,000	**	.....	....	.....	3 37½	3 00	3 12½	3 87½	4 75	5 50	7,800
Best and Belcher, G. S.	Nevada.	545	10,080,000	100,800	136,192	July 13, '74, 50c.	....	.....	48 25	48 25	49 50	50 50	56 00	56 50	2,600
Bullion, G. S.	Nevada	943½	10,000,000	100,000	2,052,000	Sept. 22, '76, $2.50.	....	.....	32 50	32 00	31 00	30 00	30 00	30 12½	1,550
Caledonia, G. S.	Nevada,	2,188	10,000,000	100,000	1,210,000	Aug. 28, '76, $1.00.	....	.....	13 25	13 25	11 50	11 50	13 87½	13 00	1,950
California, G. S.	Nevada,	600	54,000,700	540,000	....	.....	8,640,000	Dec. 8, '76, $2.	*51 00	53 00	53 00	53 50	51 50	50 50	350
Centennial, G.	Califor.	65 acres	1,000,000	100,000*b*	**	.....	....	.....	....	....	....	....	....	....	....
Chollar Potosi, G. S.	Nevada,	1,400	2,800,000	28,000	1,282,000	June 26, '76, $5.	3,080,000	Feb. 10, '72, $1.	90 50	89 50	90 00	91 50	94 50	90 00	690
Cleveland, G.	Colo.	3,715	250,000	25,000*b*	....	.....	....	.....	9 25	9 25	8 75	9 00	9 62½	9 75	3,300
Cons. Hercules & Roe, S	Colo.	16,500	1,000,000	100,000	**	.....	120,000	.....	....	....	....	....	....	....	.....
Cons. Imperial, G. S.	Nevada,	468	50,000,000	500,000	125 000	July 25, '76, 25c.	....	.....	2 50	2 75	2 75	2 00	2 50	2 50	5,700
Con. N. Slope & E.C.T.	Colo.	15,000	500,000	10,000	**	.....	....	.....	*5 00	....	....	....	4 75	5 25	600
Cons. Virginia, G. S.	Nevada,	710	54,000,000	540'000	411,200	June 11, '73, $3.	25,920,000	Dec. 4, '76, $2.	50 00	47 50	49 50	....	50 25	49 00	525
Confidence, G. S.	Nevada,	130	2,496,000	24,960	243,840	March 18, '73, $1.	78,000	May 1, '65, $8.33½	....	14 75	14 25	12 00	13 12½	13 25	1,850
Crown Point, G. S.	Nevada,	600	10,000,000	100,000	1,173,370	Oct. 26, '76, $1.	11,588,000	Jan. 12, '75, $2.	8 25	9 00	9 00	8 87½	8 75	8 25	1,400
Douglas Mining Co.	Colo.	21,000	1,000,000	10,000	**	.....	....	.....	....	....	....	....	....	28 25	300
Eureka Cons. G. S. L.	Nevada,	..	5,000,000	50,000	100,000	May 26, '76, $1.	1,000,000	Aug. 5, '75, $1.	....	....	....	....	....	....	....
Exchequer, G. S.	Nevada,	400	10,000,000	100,000	280,000	Sept. 23, '76, $1.	....	.....	13 00	13 75	13 62½	12 75	13 00	12 87½	2300
Gould and Curry, G. S.	Nevada,	621	10,800,000	108,000	2,018,000	Dec. 11, '76, $1.	3,934,800	Oct. 10, '70, $10.	13 00	14 25	13 50	15 50	17 50	17 00	2200
Grant, G. S.	Nevada,	1,000	10,000,000	100,000	....	.....	....	.....	8 12½	8 50	7 25	6 50	6 87½	7 00	4,150
Granville Gold Co.	N. Car.	9,000	1,000,500	100,050	**	.....	....	.....	2 75	2 87½	3 37½	3 50	3 62½	3 75	6,900
Hale & Norcross, G. S.	Nevada,	400	11,200,000	112,000	2,242,000	Oct. 10, '76, $1.	1,598,000	April 10, '71, $5.	8 37½	8 50	8 00	8 25	8 25	8 25	3,000
Hukill, S.	Colo.	3,285	1,003,050	10,000	**	.....	20,000	Nov. 1, '76, $1	....	....	....	....	....	....	.....
Indian Queen, S.	Nevada,	1,000	3,000,000	60,000	....	.....	60,000	.....	....	....	....	....	....	....	.....
Julia Cons, G. S.	Nevada,	3,000	11,000,000	110,000	110,000	Sept. 11, '76, $1.	....	.....	6 25	6 12½	6 25	6 00	5 75	5 75	1,900
Justice, G. S.	Nevada,	2,100	10,500,000	105,000	1,502,500	Sept. 14, '76, $5.	....	.....	26 00	26 50	25 00	....	26 50	26 50	500
Kentuck, G. S.	Nevada,	95	3,000,000	30,000	270,000	Dec. 3, '74, $1.	1,252,000	March 8, '70, $5.	10 87½	10 75	10 87½	....	10 25	10 62½	1,500
Kossuth, G. S.	Nevada,	2,700	5,400,000	108,000*c*	405,000	Aug. 15, '76, 50c.	....	.....	*2 00	1 62½	1 62½	1 62½	2 00	....	1,600
Leopard, G. S.	Nevada,	1,500	5,000,000	50,000	50,000	March 31, '76, $1.	137,500	Nov. 15, '76, 50c.	6 00	6 25	5 62½	....	6 75	5 37½	2,500
Luzerne Mining Co.	Colo.	4,200	5,000,000	500,000	**	.....	....	.....	2 12½	2 25	2 37½	2 37½	2 50	2 00	5,800
Mer. and Min. Tun. Co.	Colo.	30,000	500,000	50,000	**	.....	....	.....	....	5 00	....	....	....	....	100
Merrimac, S.	Mass.	600	10,030,000	100,800	100,800	Sept. 5, '76, 50c.	....	.....	5 00	4 75	4 50	4 50	4 62½	4 50	5,200
Mexican, G. S.	Nevada,	1,500	500,000	50,000*b*	**	.....	10,000	Nov. 10, '76, $1.	....	....	21 00	21 37½	*23 87½	....	400
Morning Star.	Nevada,	1,600	8,000,000	80,000	....	.....	....	.....	....	....	....	....	....	....	.....
Northern Belle, S.	Nevada,	1,600	5,000,000	50,000	....	.....	950,000	Dec. 15, '76, $1.	36 00	37 25	35 00	34 87½	33 50	....	800
Ophir, G. S.	Nevada,	675	10,080,000	100,800	2,034,400	May 14, '75, $1.	1,394,400	March 9, '64, $4.	40 00	....	34 50	34 25	36 00	*34 00	500
Original Comstock, G. S.	Nevada,	....	10,000,000	10,000	....	.....	....	.....	12½	....	*1 00	1 00	*87½	*37½	450
Overman, G. S.	Nevada,	1,200	3,840,000	38,400*b*	2,222,280	Oct. 21, '76, $3.	....	.....	125 00	122 00	122 00	116 00	131 50	125 00	350
Pleasant View.	Colo.	1,200	200,000	20,000*b*	**	.....	....	.....	....	....	....	*1 75	2 87½	2 62½	100
Raymond and Ely, G. S.	Nevada,	5,000	3,000,000	30,000	540,000	Dec. 5, '76, $1.	3,075,000	Sept. 10, '73, $3.	2 87½	3 37½	3 00	3 00	3 37½	3 62½	3 50	2950
St. Joseph Lead Co.	Missou.	2520 acs.	1,000,000	100,000	....	.....	210,000	.....	6 25	....	6 12½	6 00	6 00	6 00	.....
Santiago, G. S.	Nevada,	2,000	11,200,000	112,000	....	.....	....	.....	....	....	....	....	....	....	.....
Savage, G. S.	Nevada,	800	11,200,000	112,000	2,858,000	Nov. 25, '76, $1.	4,460,000	June 11, '69, $3.	12 00	12 00	12 12½	11 75	11 75	11 87½	1,900
Seg. Belcher, G. S.	Nevada,	160	640,000	6,400	244,800	April 11, '76, $5.	....	.....	*95 00	95 00	95 37½	95 00	*92 50	88 00	210
Sierra Nevada, G. S.	Nevada,	3,630	10,000,000	100,000	1,500,000	Oct. 24, '76, $1.	102,500	Jan. 16, '71, $1.	11 87½	12 75	13 75	12 00	12 37½	12 25	1630
Silver City, G. S.	Nevada,	3,920	6,310,000	63,100	15,775	Nov. 16, '76, 25c.	....	.....	....	....	*1 50	*1 50	....	*1 50	..
Silver Hill, G. S.	Nevada,	5,470	10,800,000	108,000	810,000	Sept. 18, '76, $1.	....	.....	10 87½	....	9 75	10 12½	....	....	1,000
South Comstock, G. S.	Nevada,	1,500	10,000,000	100,000	44,000	May 3, '76, 10c.	....	.....	....	....	....	....	....	....	.....
South. California, G. S	Nevada,	1,500	5,000,000	50,000	....	.....	....	.....	....	....	....	....	....	....	.....
Southern Star, G. S.	Nevada,	1,500	6,000,000	600,000	....	.....	....	.....	*1 50	....	*1 25	*1 12½	*1 00	*1 12½	.....
Treuton, G. S.	Nevada,	..	10,000,000	100,000	....	.....	....	.....	....	....	....	....	....	....	.....
Union Cons. G. S.	Nevada,	850	10,000,000	100,000	260,000	March 3, '76, $1.	....	.....	12 25	*12 00	11 75	11 00	11 62½	11 25	1,400
West Belcher, G. S.	Nevada,	1,000	10,000,000	100,000	....	.....	....	.....	....	....	....	....	*2 75	....	.....
Yellow Jacket, G. S.	Nevada,	1,200	12,000,000	120,000	2,718,000	Oct. 28, '76, $1.	2,184,000	Aug. 10, '71, $2.50.	....	*19 00	18 87½	17 00	18 25	18 00	350
Young America, G. S.	Nevada,	1,000	3,000,000	30,000	6,000	Oct. 23, '76, 20c.	....	.....	....	....	....	....	....	....	... ..

Assessments levied to date, $27,805,537 | Div'ds pd. to date, $85,211,400 | Total sales.....81,925

BOSTON STOCK MARKET.

									Fri.	Sat.	Mon.	Tues.	Wed.	Thurs.	
Allouez, C.	Mich.	..	$1,000,000	20 000	$940,020	May 9, '76, $5.	....	.....	$8 00	7 75	7 00	7 00	6 00	7 00	.....
Calumet and Hecla, C.	Mich.	2¾ mile	2,000,000	80,000*d*	1,200,000	.....	$11,050,000	Oct. 21, '76, $5.	172 00	171 50	173 00	173 50	173 75	173 50	.....
Central, C.	Mich.	..	500,000	20,000*c*	100,000	June, '62, 65c.	1,020,000	Feb. 17, '76, $5.	35 00	35 00	35 00	35 00	35 00	36 00	.....
Copper Falls, C.	Mich.	..	1,000,000	20,000*d*	535,000	May 10, '76,	100,000	Nov., '71, $1.	3 62½	3 75	3 87½	3 75	3 75	3 62½	.....
Dana, C	Mich.	..	500,000	20,000*d*	68,020	Jan., '73, 50c.	....	.....	10	10	10	10	10	10	.....
Dawson, S.	Canada.	..	1,200,000	60,000*f*	....	.....	....	.....	10	10	11	11	12	12	.....
Duncan, S.	Canada.	..	1,200,000	60,000*f*	75,000	July, '76, 41¾.	....	.....	4 37½	5 50	5 25	4 25	4 75	4 87½	.....
Franklin, C.	Mich.	..	500,000	20,000*d*	363,000	June, '68, $5.	585,000	Nov., '71, $1.	14 00	14 12½	14 25	14 75	14 50	14 50	.....
Humboldt, C.	Mich.	..	500,000	20,000*d*	100,000	Sept. 28, '76, 15c.	....	.....	17	18	17	18	17	17	.....
International, S.	Canada.	..	1,200,000	60,000*f*	....	.....	....	.....	37½	62½	56¼	50	62½	50	.....
Madison, C.	Mich.	..	50 1,000	20,000*d*	123,000	Sept. 11, '74, 10c.	....	.....	28	29	30	27	50	50	.....
Mesuard, C.	Mich.	..	500,000	20,000*d*	160,000	April 12, '05, 50c.	....	.....	20	20	21	20	27	27	.....
Minnesota, C.	Mich.	..	1,000,000	20,000*e*	436,000	June 10, '69, $1.	1,820,000	Mch. 15, '76, 50c.	1 50	1 62½	1 75	1 75	1 75	1 62½	.....
National, C.	Mich.	..	500,000	20,000*e*	195,000	Oct., '75, $1.	360,000	Oct., '73, $1.	1 25	1 31¼	1 37½	1 37½	1 50	1 50	.....
Osceola, C.	Mich.	..	1,000,000	40,000*d*	850 000	May 1, '76, $2.	....	.....	19 75	19 75	18 50	18 75	18 00	18 00	.....
Petherick, C.	Mich.	..	500,000	20,000*d*	165,533	March 22, '76, 50c.	....	.....	37½	37½	40	40	40	40	.....
Pewabic, C.	Mich.	..	500,000	20,000*d*	185,000	June, '68, $3.	460,000	July, '73, $1.	2 25	2 37½	2 50	2 50	2 75	2 75	.....
Phenix, C.	Mich.	..	1,000,000	20,000*d*	817,500	Sept., '70, $3.	....	.....	....	....	....	....	....	....	.....
Quincy, C.	Mich.	..	*h* 200,000	20,000*b*	....	.....	2,050,000	Oct. 28, '76, $3.	47 00	48 00	47 50	48 25	48 75	48 50	.....
Ridge, C.	Mich.	..	500,000	20,000*d*	....	.....	....	.....	4 75	4 87½	4 75	4 87½	4 75	4 75	.....
Rockland, C.	Mich.	..	500,000	20,000*d*	495,000	Jan., '74, $1.	....	.....	27	28	27	27	27	27	.....
Star, C.	Mich.	..	500,000	20,000*i*	265,000	March 30, '76, 50c.	....	.....	35	35	35	35	35	35	.....
Superior, C.	Mich	..	500,000	20,000*i*	340,000	March, '74, 25c.	....	.....	10	12½	12½	12½	12½	12½	.....

Assessments levied to date, $7,440,033 | Div'ds paid to date, $17,445,000 | Total sales ..... — shares.

G. Gold. S. Silver. L. Lead. C. Copper. *a* The par value of shares is $100, unless otherwise designated. *b* Par value $10. *c* Par value $50. *d* Par value $25 each. *e* Par value $15. *f* Par value $20. *g* Closing quotations represent the latest prices bid. Prices asked will have a * affixed. *h* Full paid. *i* On the four old companies. ** Not Assessable.

this item, as compared with 1876, of $161,750 For lighting the public buildings, etc., a further appropriation of $31,450 was made. The appropriation for the erection of new lamps was reduced from $28 to $25 per lamp.

Peoples' Gas Light and Fuel Company.—We note a recent auction sale in Philadelphia of 440 shares of the stock of this company at $5 per share.

Chicago Gas-Light and Coke Company.—We note recent bid quotations of the stock of this company at $120 per share.

The Chicago Gas Difficulty.—A compromise has been effected between the Chicago Council Committee and the Peoples' Gas Company, by the Company offering to furnish gas to the city at $2 per 1,000 feet through three-feet burners. The Mayor and Comptroller are authorized to close the contract on the above basis, the contract to date from October 1st.

The Manhattan Gas Company will hold its annual meeting on the 1st of January next.

Metropolitan Gas Company—The annual meeting of this company will be held on the 8th of January next.

COMPANIES OUT OF TOWN.

We are reported no change in the quotations of the out of town companies, which, in the absence of transactions, are nominal. Our issue of Nov. 4 contains the prices of these, as were generally prevailing on that date.

The following list of Companies in New York and vicinity are corrected weekly by GEORGE H. PRENTISS, Broker and Dealer in Gas Stocks, No. 30 Broad st., N. Y.

Companies in New York and Vicinity.	Cap. Stk.	Par.	last Divid.	When Paid.	Bid.	Askd.
			pr.c			
Mutual, N. Y.	$5,000,000	$ 100	2½	Oct. '76	101	103
" " Bonds	90,000	1,000	†3½	Aug. '76		109
NewYork, "	4,000,000		5	Nov. '76	134	136
Metropol. "	2,500,000	100	5	Sep. '76	145	—
" " Certf.	1,000,000	....	3½	" "	102½	104½
" " Bonds	500,000	1,000	3½	Dec. "		102½
Harlem "	1.850,000	50	4	Aug. '76	105	—
Manhattan "	4,000,000	50	10	July "	240	246
Brooklyn, B'klyn	2,000,000	25	5	Nov. '76	179	181½
Nassau "	1,000,000	25	4	Jan. '76	80	—
" " Certf.	700,000	1,000	3½	Nov. '76	95	—
People's "	1,000,000	10	3½	Jan. '76	50	55
" " Certf.	300,000	1,000	3½	July '76	87	90
" " Bds	325,000	....	3½	Aug. "		95
Metropol. "	1,000,000	10	3½	Nov. '76	75	80
Wmsburgh "	1,000,000	50	3	Oct. '76	130	—
" " Certi.	1,000,000	....	3½	July "	100	102½
Citizen's "	1,200,000	20	2½	Jan. '76	98	100
" " Certf.	320,000	1,000	3½	Oct. "	98	100
J. C. N. J.	750,000	20	5	July, '75	160	—
Centl. Westch. N.Y.	466,000	50	4	July. "	90	—
Subur'n " "	390,000	50				90

† Gold.

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PHILADELPHIA, December 19th, 1876.

NOTICE is hereby given to the Stockholders of this Company, that the Annual Meeting and Election for President, six Managers, Treasurer, and Secretary, will take place on the second Monday, 8th of January next, at 12 M.
DAVID J. BROWN, Secretary.

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